Opinion: We are ill-prepared for attacks on the Internet. PAGE 23

Recruiting: Return of the dot-goners. PAGE 28

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PHOTO: DAVID JOEL

Building CONFIDENCE

As USG's first CIO and one of the few officers brought in from the outside at the construction materials maker, Jean Holley faced a daunting set of challenges: fast-forwarding the company's legacy-bound IT infrastructure into the 21st century, bringing rogue IT workers into the fold and abolishing the company's view of IT as an administrative function.

Profile by Kathleen Melymuka begins on page 24.

FLIGHT FEAR SHIFTS TECH PLANNING

Projects to simplify check-in jeopardized

BY JENNIFER DISABATINO

Before the hijacking of four commercial airplanes on Sept. 11, the biggest IT imperative for most carriers was leveraging technology to get passengers through the airport and aboard their flights as quickly as possible.

Now, under more stringent security guidelines, at least one key project is on hold, and others are being reconsidered.

In April, United Air Lines Inc. in Chicago announced that it would install more than 1,100 self-service kiosks in 25 airports over the next two years

Projects, page 14

TRAVEL SAFETY

Boeing eyes broadband to improve security

BY JAMES COPE
CHICAGO

With airline passenger traffic down and concerns about airplane security rising following the Sept. 11 terrorist attacks on the U.S., Phil Condit, chairman and CEO of The Boeing Co., last week disclosed plans to use broadband technology to beef up security on aircraft.

"Part of the challenge now is not putting things off," Condit said, speaking at Boeing's new corporate headquarters here. "We're asking, 'How do we move ahead to make the [airline] system more secure and

Boeing, page 14

USERS VOICE DOUBTS ON JAVA SPEC

They say J2EE 1.3 lacks Web services support

BY LEE COPELAND

Aiming to improve connectivity and make it easier to manage Enterprise JavaBeans, Sun Microsystems Inc. last week released an enhanced version of its Java 2 Enterprise Edition 1.3 specification, the basic building block for Java-based application servers.

But while J2EE 1.3 addresses some key integration issues, users and analysts said it lacks sufficient Web services support features, which are critical for letting applications swap functionality over the Internet.

"There are some issues with J2EE that are evolving still, and personally, I would not jump into it right now for that reason," said George Mizzi, application infrastructure manager at New York-based Sanford C. Bernstein & Co. Mizzi said the lack of Web services support is the most significant hole in the J2EE specification.

The $850 million investment management firm recently built a trading desk application that uses Web services in the

Java Spec, page 61

ONLINE ATTACK CONCERNS GROW

Experts urge vendors to boost product security

BY PATRICK THIBODEAU
WASHINGTON

The war on terrorism could increase the number of cyberattacks aimed at U.S. firms already struggling to repair a rapidly escalating array of vulnerabilities to Internet-connected systems.

It's the cyberequivalent of the "perfect storm," the merg-

Online Attacks, page 61

Web of Politics

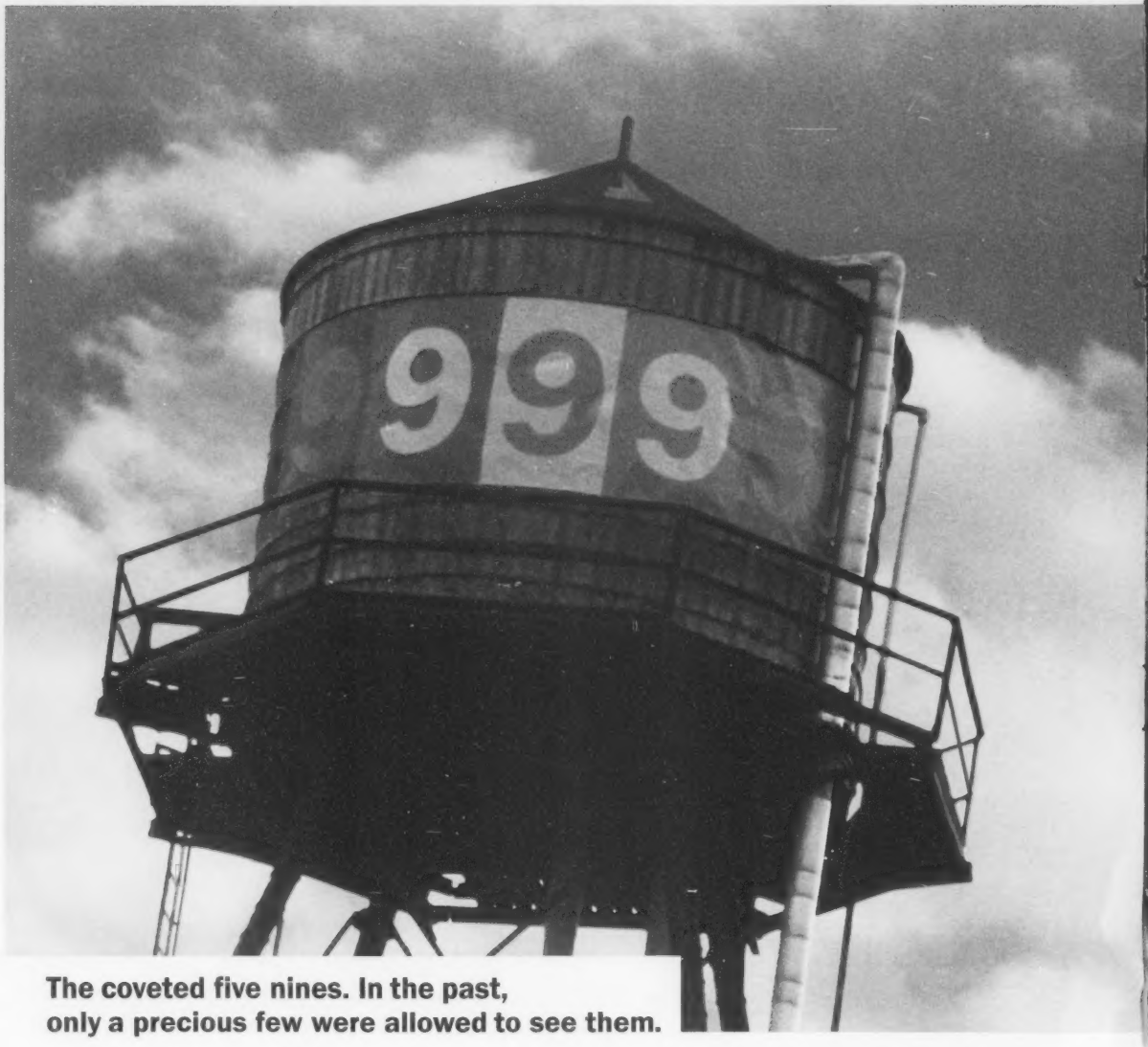
Some past incidents:

- Hacker activity increased after a U.S. spy plane was captured by China in April.
- NATO Web servers received sustained ping saturation and DDOS attacks during air strikes in Kosovo and Serbia last year.
- Web site defacements in Israel increased as the Palestinian conflict worsened.

What might attackers do now?

- Deface Web sites.
- Launch DDOS attacks.
- Use worms and viruses to exploit vulnerabilities.

SOURCE: INSTITUTE FOR SECURITY TECHNOLOGY STUDIES, DARTMOUTH COLLEGE, HANOVER, N.H.



The coveted five nines. In the past, only a precious few were allowed to see them.

99.999% uptime. For a server operating system, it's a measure of reliability that translates into just over five minutes of server downtime per year.* For your business, that means servers are up and running when people need them. Of course, rumors of this 99.999% uptime usually start under ideal lab conditions. But where are these five nines when your business needs them? If you're using Microsoft® Windows® 2000 Server–based solutions, they may be closer than you think. Today Starbucks, FreeMarkets and MortgageRamp, an affiliate of GMAC Commercial

Windows 2000 Server Family

*This level of availability is dependent on many factors outside of the operating system, including other hardware and software technologies, mission-critical operational processes and professional services.

Mortgage, are using Windows 2000 Server–based systems designed to deliver 99.999% server uptime. Of course, not all installations require this level of reliability, but one thing is for sure: The Windows 2000 Server family can help you get to the level of reliability you need. In fact, industry leaders such as Compaq, Dell, Hewlett-Packard, IBM, Unisys, Stratus and Motorola Computer Group can work with you to deliver solutions with up to five nines uptime. To learn more about server solutions you can count on, visit **microsoft.com/windows2000/servers** Software for the Agile Business.

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DIGITAL CRIMINAL CASE RECORDS

The Queens County, N.Y., District Attorney's Office has replaced paper records for the 50,000 criminal cases it handles each year with a Linux-based document-imaging system, says Robert Schlesinger, director of information services. **PAGE 46**

JAMES SCHAEFER

SECURITY AMBASSADORS

As companies increasingly put security in the hands of systems specialists, they need IT liaisons, such as Leslie Peckham of American Family Mutual Insurance, who can help business units and IT understand each other's needs. **PAGE 36**

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7 The federal government looks to advanced smart-card technology to prevent identity fraud.

8 Most cellular carriers will miss today's deadline for compliance with the FCC's location-finding regulations.

9 Firms automate to flag financial transactions by known terrorists.

10 Microsoft responds to Gartner's advice that users should consider alternatives to Microsoft's Internet Information Server.

12 Fidelity gears up for this month's massive conversion of its data to an XML format.

Quick Link For breaking news, updated twice daily at noon and 5 p.m., visit the *Computerworld.com* Web site:
www.computerworld.com/q?q4000

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24 Jean Holley has spent three years transforming a 1970s-style IT operation at USG into a true partnership with its business units.

28 Brick-and-mortar companies that lost IT staffers to dot-com firms are welcoming them back with open arms — and many of the perks that lured them away.

30 Ford and UPS are six months ahead of schedule with their plans to speed the delivery of new cars and trucks from factories to dealers, thanks to a Unix-based logistics package.

40 Workstyles: IT staffers at Philip Morris know better than anyone that their company is more than a maker of tobacco products, since they support technical operations for five divisions.

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44 With privacy a growing concern, IT managers are looking to closely manage access to their largest repositories of information: data warehouses.

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49 QuickStudy: Transaction processing is the unambiguous and independent execution of a set of operations on data in a relational database. Find out more in this week's primer.

50 Security Journal: Mathias Thurman dives into security testing on his company's newly redesigned Web site.

51 Emerging Companies: RLX Technologies' compact blade servers promise to cut power requirements and conserve space in Internet data centers.

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20 **Pimm Fox** warns that companies' lack of IT preparedness for disasters amounts to another tragedy waiting to happen.

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ONLINE

ATTACK AFTERMATH

For the latest *Computerworld* articles about the aftermath of the Sept. 11 terrorist attack, visit our special coverage page.
www.computerworld.com/q?a1030

NATIONAL ID?

What do you think about the idea of implementing a national identification card system as a way to help stop terrorism? Post your opinion in our online discussion forum.
www.computerworld.com/q?a1040

TRAVEL CHECKLIST

If you're going on a business trip, see reviews editor Russell Kay's checklist for must-have laptop accessories.
www.computerworld.com/q?23255

CRM COVERAGE

For news, analysis and resources about customer relationship management, head to our CRM Knowledge Center.
www.computerworld.com/q?k1300

AT DEADLINE

Court Pushes for Microsoft Settlement

U.S. District Court Judge Colleen Kollar-Kotelly ordered Microsoft Corp. and the government to meet "around the clock" in an attempt to settle the antitrust case against the software vendor. The judge gave the two sides until Oct. 12 to reach an agreement on their own. If they don't, she said, a mediator will be called in and given until Nov. 2 to help produce a settlement.

EDS Adding Portal to Navy/Marine Intranet

The U.S. Navy gave Electronic Data Systems Corp. a $9 million contract to add a Web portal to the $6.9 billion Navy/Marine Corps Intranet project, which is being managed by the Plano, Texas-based IT services firm. EDS will manage the land-based implementation of the portal, and the Navy will be in charge of the at-sea portion.

StorageTek Set to Ship Faster Tape Drive

Louisville, Colo.-based Storage Technology Corp. next week plans to release a new tape drive that supports data transfer rates of 2G bit/sec. Tape drives previously were limited to 1G bit/sec. transfer rates, which hindered the performance of storage-area networks.

Short Takes

Tokyo-based technology vendor NEC CORP. cut its revenue forecast and said it now expects to report a loss of about $1.3 billion for its fiscal year ending in March, after previously predicting a profit of more than $500 million. . . . CLARENT CORP., a Redwood City, Calif.-based maker of technology for use in converged voice and data networks, slashed its projected third-quarter revenue total by more than 50%. Clarent also said it's laying off about half of its 700 workers.

Supply Chains Face Changes After Attacks

Users may need more flexible systems

BY MARC L. SONGINI

Some companies last week said automated supply chain systems are minimizing the immediate impact of the Sept. 11 terrorist attacks in the U.S. on their global supply and distribution networks. But users and analysts warned that such systems may need to be changed to provide longer-term answers to the uncertainties created by the attacks.

With ground and air transportation schedules more erratic now and customs clearances taking longer to complete, many companies are being challenged to keep their assembly lines supplied with product components and to deliver service and maintenance parts to their customers.

Supply chain systems may require redesigns so companies can do a better job of handling "surge and ebb" situations in product demand and stock availability, said Scott Stephens, chief technology officer at the Supply-Chain Council Inc., a Pittsburgh-based industry consortium.

Users and vendors will also have to work on making supply chain systems more disaster-ready, said Michael Bittner, an analyst at AMR Research Inc. in Boston. For example, companies should build automated alternative sourcing functions into their systems, he said. Technology that can generate international trade compliance documents is also becoming more critical for users, Bittner added.

When all flights in the U.S. were temporarily stopped after the attacks, NCR Corp. quickly switched from airborne carriers to ground transportation. The Dayton, Ohio-based technology vendor has also had to deal with the loss of a shared product distribution facility run by Atlanta-based United Parcel Service Inc. that was located just hundreds of feet from the World Trade Center in New York, said Todd Bollenbacher, vice president of service design and logistics at NCR.

Fortunately, NCR was able to implement Y2k contingency plans supported by its supply chain and procurement system, which is based on applications from Oracle Corp. and Fairport, N.Y.-based Xelus Inc., plus proprietary software. Recoding product shipment labels took only hours, Bollenbacher said.

JOHN STOCK: HON Industries cut rush delivery shipment times in half.

But more changes may follow. NCR is looking at tweaking its distribution systems so they take the longer delivery times of ground-based transportation into account when setting shipment dates for its customers, he said. And the company is considering retooling how products are distributed to its own warehouses, which would also require systems changes.

In addition, Bollenbacher said he would like to see procurement systems that support automated selection of alternative suppliers. Currently, he noted, the system's software requires some manual programming to switch vendor codes.

John Stock, vice president of distribution and logistics at HON Industries Inc., said the Muscatine, Iowa-based office furniture maker used a capacity and supply chain planning application from SynQuest Inc. in Norcross, Ga., to cut its delivery lead times on rush shipments from two weeks to five days immediately following the terrorist attacks.

The software provides "immediate visibility to capacities and shipping lanes, and in the past, we didn't have that," Stock said. With the software in place, he added, workers "didn't have to get on the phone and check capacity availability to fulfill orders."

Quick Link For access to additional resources, visit our Supply Chain/ERP Knowledge Center.
www.computerworld.com/q?k2000

Chemical Exchanges Put Security Under Microscope

Systems reassessed in wake of attacks

BY MICHAEL MEEHAN

Online marketplaces designed to speed business-to-business transactions in the chemicals industry are now rushing to examine their security systems to look for blind spots that could allow terrorists to obtain potentially deadly substances.

John Beasley, chairman and founder of ChemConnect Inc., said the San Francisco-based online exchange launched a full-scale investigation into its user screening and approval practices after the Sept. 11 terrorist attacks on the U.S.

"It will probably take a few weeks [to finish the probe], because we're trying to figure out what we're not doing," Beasley said. "What we're looking for is not obvious. To a degree, you have to think like a terrorist to figure it out."

CheMatch.com Inc. in Houston has initiated a similar scouring of its security practices and technology, said Michael Ereli, vice president of technology at the ChemConnect rival.

CheMatch previously decided against requiring the use of digital certificates or biometric identifiers by people who process transactions through its systems. But that's "the first thing we're taking a second look at," Ereli said. "It seemed too cumbersome at the time, but everything's changed now."

According to Beasley, the basic key to security for a business-to-business exchange is to gain familiarity with those who are trading goods in the largely faceless world of e-commerce. ChemConnect checks business licenses, hazardous-materials certifications and company profiles for every new user of the site, he said.

The exchange also blocks users from countries that are on U.S. Department of State warning lists and cross-checks new users against FBI warning lists, Beasley said.

But ChemConnect started as an industry bulletin board for companies informally seeking new business partners and is still sometimes used in that capacity. That type of usage has drawn federal attention since the inception of the company's Web site, Beasley said. Firms using the site as a bulletin board are expected to screen their potential trading partners themselves, he added.

Owen Kean, director of online communications at the American Chemistry Council Inc., a lobbying and safety guidelines group in Arlington, Va., noted that the chemicals industry is reviewing how securely it trades toxic, caustic and explosive materials. "Even what we thought was good may not be good enough," he said.

Feds Consider New Antiterrorist Smart-Card Technology

But national ID cards face strong opposition

BY DAN VERTON
WASHINGTON

The ability of the Sept. 11 terrorists to obtain forged identifications and airport credentials has prompted the federal government to consider new technologies for authenticating the identities of airline passengers and employees, aviation security personnel and federal employees with access to secure facilities.

The White House reiterated last week that it has no plans to introduce a national ID card. But officials from the Justice Department and other federal agencies, along with House minority leader Richard Gephart (D-Mo.), are clearly interested in ID card technology. Last week, they invited Dan Kehoe, president and CEO of Los Gatos, Calif.-based UltraCard Inc., to Washington to demonstrate his company's UltraCard smart-card technology.

Security officials are interested in the UltraCard because it has unique storage capabilities that overcome the limitations of current smart cards to store multiple sets of biometric data, such as fingerprints, high-resolution iris scans and voiceprints.

The UltraCard is capable of storing 20MB of data, whereas traditional smart cards store only 64KB. The lack of storage capacity has been the main stumbling block in the use of biometrics in smart cards, said Don Mann, chief technology officer at UltraCard.

"To do full security without false acceptance, you need more than one biometric," said Mann. "You need more than one fingerprint; [you need] a virus scan and a high level of encryption," he said. It takes 120KB to store a single FBI-level fingerprint, Mann said.

The Bush administration's reluctance to push for a national ID card comes as no surprise to those familiar with the thorny political issues surrounding the proposal. The Clinton administration and Congress entertained the idea in 1998, when agencies suggested using ID cards to track information on foreign workers, health care recipients and parents who are behind in child support payments. Past legislative proposals failed due to concerns about potential privacy violations, but the Sept. 11 terrorist attacks have rekindled the debate.

The idea of a national ID card is not without its proponents. Oracle Corp. CEO Larry Ellison has offered the government the software necessary to build the infrastructure for a national ID card system free of charge.

THE ULTRACARD can store 20MB of data, rather than the typical 64KB.

An Oracle spokesman confirmed Ellison's pledge but said the company had no details on the type of software Ellison had in mind.

Ellison's suggestion to build a central database has been one of the key areas of concern for members of Congress and privacy groups. The UltraCard, on the other hand, would avoid that problem by enabling authorities to conduct local authentication without having to transmit biometric data across the Internet "to a hackable database," said Mann. All of the biometrics and algorithms could be stored on the card.

Donna Farmer, CEO of the New York-based Smart Card Alliance, an industry group representing 185 technology providers, said that while she isn't familiar with the details of the UltraCard's capabilities, many of the 64KB cards that are now available are multiple-application cards and have some capabilities to support biometrics and multiple encryption-key processing.

In fact, the Defense Department in May began rolling out 7,000 smart cards as part of its Common Access Card (CAC) program. The CAC uses public-key infrastructure certificates and a central database known as the Real-time Automated Personnel Identification System. Fingerprint images, however, aren't stored on the card for privacy reasons.

According to Farmer, the policy issues surrounding personal privacy and the development of a national ID card remain the driving force behind the reluctance to expand the technology's use.

"There are a lot of issues that get wrapped up in the national ID discussion that have nothing to do with the technology," said Farmer, who has also served as legal counsel to the House Science Committee. "We still have all of the policy and procedure issues that we've had before. We're trying to be sensitive to the fact that it's still just a tool, and it won't fix every possible problem."

UltraCard plans to ship the first set of cards to government agencies in China and Europe in the first quarter of next year. However, production could be placed on a fast track for delivery in the U.S. at the same time or sooner, Kehoe said.

Getting Carded

How the UltraCard compares with a traditional smart card:

UltraCard: 20MB of storage
Smart card: 64KB of storage

UltraCard: Applies hard disk drive technology to credit card-size smart card.
Smart card: Cost and size increase along with capacity.

UltraCard: $5 to $6
UltraCard Reader: $100

Legislation Pushed to Track Terrorists Over Networks

BY PATRICK THIBODEAU
WASHINGTON

The Bush administration is seeking quick action by Congress on a sweeping set of antiterrorism laws intended in part to make it easier for law enforcement agencies to track communications over phones and computer networks.

The proposal expands the government's wiretap authority, allowing law enforcement agencies to seek one order to track communications in any jurisdiction and over any technology. In short, it gives enforcement agencies the ability to monitor an individual, regardless of what form of communication — landline, e-mail or cell phone — a suspect uses.

But the proposal doesn't address encryption, which is attracting increasing legislative interest. Lawmakers are investigating whether encryption software should be developed with back doors that could be opened with a court order.

The current law requires investigators to seek court approval in each jurisdiction for each device being monitored. That law is "ill-adapted for use in communications over multiple cell phones and computer networks," said Attorney General John Ashcroft at a House Judiciary Committee meeting last week.

"We're not asking the law to expand, just to grow as technology grows," he said. Terrorists using networks to mask communications have a "competitive advantage," he added.

Lawmakers, while eager to give law enforcers the legal tools they need, are worried that some of the measures may not hold up in court. "Some have said it's unconstitutional on its face," said Rep. John Conyers (D-Mich.). "Let me be more polite: We're troubled; we're deeply troubled."

A key concern is that the law goes beyond terrorists and could be used in the prosecution of routine criminal cases. One provision that's raising eyebrows would allow U.S. prosecutors to use wiretap information obtained by foreign governments, even if the collection of that information violates U.S. search-and-seizure protections. Others critics say the proposal would justify the broad use of Carnivore, the FBI's e-mail search technology.

Jerry Berman, who heads the Center for Democracy and Technology, a privacy rights group in Washington, said there may be a need for new legal authorities. "But there is potential serious collateral damage to our Constitution and civil liberties in the attorney general's bill," he said.

Civil libertarians said they are worried that this legislation may move through Congress too fast. But final action on the bill may be several weeks away.

Legal Remedies

The Bush administration sent a package of new antiterrorism laws to Congress last week.

Wiretapping: Current law restricts wiretaps to certain locations. Proposed change would let investigators get a single order to track communications across multiple jurisdictions and over different types of systems.

Broader definition: Expands the definition of *terrorists* to include those who lend support to terrorist organizations and gives federal immigration authorities the power to detain suspects.

BRIEFS

ICANN Meeting Will Tackle Net Security

The Internet Corporation for Assigned Names and Numbers (ICANN) said it plans to go ahead with meetings scheduled next month in Marina del Rey, Calif., despite the Sept. 11 terrorist attacks. But because of the attacks, ICANN added, the meeting's agenda will now focus on the stability and security of the Internet's naming and addressing systems.

First .info Internet Sites in Operation

The first 52,000 Internet domain names registered under the new .info top-level domain have become operational, allowing companies to start using those addresses for their Web sites. Of the seven new top-level domains approved last year by ICANN, .info is the first to go live. It's being managed by Dublin-based Afilias Ltd.

Yahoo Adds Online Conference Service

In the aftermath of the terrorist attacks, Sunnyvale, Calif.-based Yahoo Inc. announced a pair of corporate Internet broadcast services aimed at providing alternatives to business travel. Included is a service called Virtual Conference, which Yahoo said will let companies hold online conferences with thousands of participants.

Short Takes

HEWLETT-PACKARD CO. won a three-year, $185 million contract to provide IT services at seven operations centers owned by Finland-based mobile phone maker NOKIA CORP. . . . A 21-year-old Netherlands resident who created the Anna Kournikova e-mail worm that spread last February was sentenced by a Dutch court to perform 150 hours of community service or spend 75 days in jail.

Agencies Urge Quick Rollout Of Wireless Location Service

Public-safety organizations implore FCC to uphold start date for Enhanced 911

BY BOB BREWIN

IN ANTICIPATION OF today's deadline, three national public-safety organizations last week urged the Federal Communications Commission to stop granting waivers and extensions to cellular communications companies that would allow them to miss the long-mandated start date for Enhanced 911 wireless location services.

WIRELESS

The agencies said the FCC should hit carriers that miss the deadline with "serious penalties" for noncompliance.

The Sept. 11 terrorist attacks on the U.S. — and the subsequent heavy use of cellular networks, as well as jury-rigged automatic location systems in New York — have made it difficult for the FCC to grant new waivers for a system that it first envisioned in 1996, said Jim Goerke, wireless implementation director at the National Emergency Number Association (NENA) in Columbus, Ohio.

The Sept. 11 attacks have helped focus attention on the importance of having a system that can determine the location of people who call 911 on cell phones, Goerke said, adding that the cellular carriers "have had a lot of time to get this together."

While the FCC has not indicated how it will act, analysts expect it to take a strong stand. The chances of continued leniency by the commission "are about equal to everyone being a winner in Las Vegas," said Alan Reiter, an analyst at Wireless Internet & Mobile Computing in Chevy Chase, Md.

The technology isn't perfect, but it does exist, said Reiter. The cellular industry has been engaged in "legal stalling," a tactic that won't work in the postattack world, he said.

NENA, the Association of Public Safety Communications Officials International Inc. and the National Association of State 911 Administrators, a NENA affiliate, told the FCC in a filing on Sept. 21 that the terrorist attacks require the commission "to move as quickly as possible to implement fully accurate location capability for the nation's wireless users."

Goerke said that based on his reading of the FCC's emergency-communications files, only two of the major carriers — Atlanta-based Cingular Wireless and Redmond, Wash.-based AT&T Wireless Services Inc. — are even close to meeting the requirements.

Technology Options

Travis Larson, a spokesman for the Cellular Telecommunications & Internet Association in Washington, said that although the cellular industry "has been working diligently for a number of years" to meet the deadline, the technology to make the system work isn't yet available.

The FCC has mandated that the carriers choose either an automatic location system that uses Global Positioning System (GPS) chips in receivers enhanced by back-end processing systems, or a network-based system that uses sophisticated triangulation from nearby cell towers to locate a handset.

The FCC wants carriers using a handset system to provide location accuracies to within 50 meters for 67% of all calls and accuracy to within 150 meters for 95% of calls. Carriers using a network system must provide accuracy to within 100 meters on 67% of calls and to within 300 meters for 95% of calls.

The deployment of automatic location systems will be costly. Diane McCormick, director of investor relations and a spokeswoman for Allen Telecom Inc. in Beechwood, Ohio, estimated that a nationwide rollout of location technology could cost $1 billion to $3 billion.

Carriers that have opted for the handset system said they have had problems getting the base-station equipment to upgrade their networks. Sprint PCS Group said it has run into problems with its two major equipment suppliers, Murray Hill, N.J.-based Lucent Technologies Inc. and Brampton, Ontario-based Nortel Networks Corp.

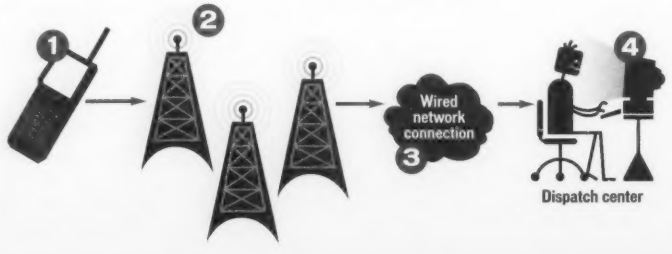
Kansas City, Mo.-based Sprint told the FCC in a filing on Sept. 20 that it planned to start selling GPS-enabled phones today and that it will sell GPS-equipped phones exclusively as of Dec. 31, 2002.

Goerke said he understands the issues carriers face in upgrading their networks but also wonders if their problems and delays are a matter of timing. The FCC should use its investigatory powers to determine whether equipment problems are the result of delayed orders, said Goerke.

"If I were the government, I would fine the carriers each a million dollars a day until they comply with the FCC location mandate," said Reiter.

How Wireless Enhanced 911 Locates Callers

Software in base stations at each cell tower uses a sophisticated triangulation system to determine the location of a caller to within 100 meters. That information is translated into latitude and longitude coordinates and is then transmitted to a police dispatch center. There, the caller's location is superimposed on a geographic information system display. This allows the dispatcher to determine at a glance the location of the caller and the nearest emergency units.



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Technology for Complying With Antiterror Rules Gets Boost

Automated systems help monitor illegal financial transactions

BY DAN VERTON
WASHINGTON

The Sept. 11 attacks heightened awareness that U.S. financial institutions and other firms face a broad range of fines and criminal charges if they allow terrorists — or any of thousands of other individuals currently on government security watch lists — to conduct financial or international trade transactions. And companies are equipping themselves with technology to prevent that from happening.

The driving force is long-standing regulations put in place by the U.S. Treasury Department's Office of Foreign Asset Control (OFAC), which enforces economic and trade sanctions against targeted foreign countries, organizations that sponsor terrorism and international narcotics traffickers. The OFAC requires banks, securities companies, export firms and tourism businesses to report within 10 days all illegal or suspicious transactions involving any one of thousands of so-called Specially Designated Nationals currently on OFAC and other government watch lists.

Those regulations, along with an executive order signed Sept. 23 by President Bush that freezes the assets of an additional two-dozen individuals and groups as part of the new war on terrorism, are prompting companies to ensure that they have all of the automated tools they need to prevent illegal transactions from slipping through the cracks.

Heightened Concerns

"This is really the first time that this mandate is being driven home," said Chuck Schardong, product manager at Innovative Systems Inc., a Pittsburgh-based firm that develops OFAC compliance software for banks and other companies. Within a few days of the Sept. 11 terrorist attacks, customers began contacting Innovative Systems for upgrades and information on the FBI's hijacker list, he said.

"There definitely has been an upswing in the number of calls we've received since Sept. 11," said Dave Leverenz, senior product manager for the risk-reduction product line at Thomson Financial Publishing in Skokie, Ill. A few years ago, most organizations "didn't even know what OFAC stood for," he said.

For large companies that process hundreds or thousands of transactions per day, using an automated system rather than a manual one could mean substantially lower fines if illegal transactions are missed but later discovered by auditors.

Several financial institutions contacted last week declined to comment, citing increased security concerns. However, one risk manager at a major bank in the Southwest acknowledged that manual systems are still being used at his bank.

"Any bank processing 75 to 100 wire transfers a day needs and probably already uses an automated system," said Leverenz. Larger banks typically process thousands of transactions per second.

In the banking industry, most OFAC violations are uncovered when one bank discovers and reports an illegal wire transfer that wasn't caught by the sending bank. Banks and companies are required to report any illegal transaction that passes through a trading partner's system, said industry experts.

"It can create an entire chain of responsibility," said Schardong.

That chain of responsibility may also be expanded worldwide and could have a significant impact on global business practices, said Kathy Little, co-chairwoman of the government and international practice group at Washington law firm Vinson and Elkins LLP.

President Bush may take additional steps such as placing sanctions on foreign banks and companies that refuse to help the U.S. locate the financial assets of terrorist groups, Little noted.

Other industry experts foresee OFAC regulations being expanded to other industries, such as the airline industry. "I see no reason why flight manifests shouldn't be compared against these lists," said Schardong.

"Prior to Sept. 11, most financial institutions saw the regulations as a burden," said Greg Kessler, a product manager at Bridger Systems Inc., a Bozeman, Mont.-based developer of OFAC management software. "Now they're seeing it as a way to combat terrorism."

AT A GLANCE

Factoring In The OFAC

Questions asked by regulators and auditors:

- Does the institution have policies and procedures in place for complying with OFAC laws and regulations?
- Does the institution maintain a current listing of prohibited countries, entities and individuals?
- Is the OFAC information disseminated to offices in foreign countries?
- Are new accounts compared with the OFAC listings prior to opening?
- Are established accounts regularly compared with current OFAC listings?

IT Trade Show Schedules Impacted by Sept. 11 Attacks

Travel concerns ground many industry events

BY LINDA ROSENCRANCE

Concerns about travel and security in the wake of the Sept. 11 terrorists attacks on the U.S. have caused many upcoming IT-related trade shows to be postponed or canceled.

"This is the worst we've ever seen," said Michael Hughes, research director at *Tradeshow Week*, a Los Angeles-based trade show publication. "About 45% of major trade shows in all industries, including IT, are being canceled or postponed."

Hughes said shows aren't being held for several reasons. Some of them were originally scheduled to take place soon after the date of the attacks, but Americans were still reeling from the news and didn't feel it was safe to travel, he said. Companies have also been concerned about shipping freight because of the increased cost of beefed-up security in response to the disaster.

"People are still dealing with grief" and remain concerned about air travel and safety, Hughes said.

Karen Jagoda, president of Baltimore-based Turtlesnap Ventures Inc., decided to postpone an investment symposium called Global Trends in Technology Development that was scheduled to open last week in Washington.

"[Some] of our key speakers and participants felt they could not attend at this time because of concerns over international travel and security," Jagoda said. "We received a number of e-mails from speakers and attendees saying they were concerned about their safety."

Staying the Course

Still, despite the many cancellations and postponements, some trade shows are being held as scheduled.

Kim Myhre, president of IT marketplace Comdex, which is presented by Los Angeles-based Key3Media Events Inc., said Comdex/Fall 2001 in Las Vegas will go on as planned from Nov. 12-16.

"While our thoughts as family members and businesspeople have been focused on the well-being of our fellow Americans, we decided we need to get back to work," Myhre said. "We haven't had any major cancellations, and all our keynote speakers have confirmed. This is a little bit of uncharted territory, and anything can happen, but we're going ahead as planned."

Many IT professionals say they're still planning to attend trade shows and conferences because it's more important than ever for them to meet and share information.

Ann Marie Horcher, a senior specialist in electronic workplace services at Dow Corning Corp. in Midland, Mich., said she still plans to attend this week's Momentum 2001, a worldwide user conference being held by Pleasanton, Calif.-based content management provider Documentum Inc. Dow Corning has canceled all company travel that isn't crucial for business for the time being for security reasons, Horcher added.

"There are two reasons we're planning to go. One is that we had other travel options — we're going to drive," said Horcher, a speaker at the event. "And also because I need to know what direction my vendors are going in for next year."

Quick Link
For a list of all canceled and postponed shows, visit our Web site.
www.computerworld.com/q?q5010

IIS Is as Secure as Other Web Servers, Claims Microsoft

Company responds to Gartner's advice that users should consider alternatives

BY JAIKUMAR VIJAYAN

MICROSOFT says its Internet Information Server (IIS) is as secure as comparable products from other vendors. The company made the assertion in response to a recent Gartner Inc. recommendation that enterprises consider alternatives to IIS if they had been hit by both the Code Red and Nimda worms.

According to the Gartner advisory, the success of the Nimda worm and of Code Red before that "highlights the risk of using IIS and the effort involved in keeping up with Microsoft's frequent security patches."

Stamford, Conn.-based Gartner's advisory was issued in the wake of the recent attack by the mass-mailing Nimda worm that infected systems running Microsoft Windows 95, 98, ME, NT and 2000.

Unlike other worms and viruses, Nimda spread via network-based e-mail, as well as by Web browsers, and it exploited back doors left open by previous viruses such as Code Red and Sadmind.

When Nimda hit, Microsoft advised installing patches and service packs on virtually every PC and server running Internet Explorer, IIS Web servers or the Outlook Express e-mail client, just as it had done with Code Red, said John Pescatore, a Gartner analyst and author of the advisory.

This constant patching and maintaining has resulted in a high cost of ownership for IIS. As a result, Pescatore recommended that enterprises that had been hit by both Nimda and Code Red look at alternatives such as Sun Microsystems Inc.'s iPlanet and the Apache Web server software

"The Gartner recommendation overlooks the fact that security is an industrywide challenge and that serious vulnerabilities have been found in all Web server products and platforms," said a Microsoft spokesman. "It is a folly to believe that if you switch from one product to another, you are protected.

"Those customers that installed all the [recommended] patches were protected from Nimda," the spokesman said.

But the Gartner recommendation seems to be resonating with at least some users.

Palo Alto, Calif.-based Fenwick & West LLP plans to migrate from its IIS servers to a Linux operating environment running Apache's Web server software because of security concerns.

Financial considerations are also driving the move — it's cheaper to run Apache on Linux than it is to run IIS, said Matt Kesner, chief technical officer at the law firm.

Fenwick & West escaped being hit by last week's Nimda virus. But the experience of dealing with a previous IIS-related vulnerability and the continuous effort needed to keep IIS secure were bothersome, Kesner said.

Moving to Apache is going to be difficult, and it will offer less functionality than IIS, predicted Kesner. Even so, he said, "we think [Apache] is going to be a smaller target."

Because of security concerns, Planogramming Solutions Inc., a space-management company in Jacksonville, Fla., is moving to a Linux/Apache environment, even though it's more difficult to set up than IIS, said Pat Quick, an information systems specialist at the company.

"I know that Windows, Office and many other packages are very popular and have a wide reach that makes them *the* target to get to. But to be the biggest should carry some responsibility to be the best. This is, sadly, not the case," Quick wrote in an e-mail to *Computerworld*.

Not everybody shared the same sentiments, though.

"To be fair, Microsoft has responded well in every case" where its software has been attacked, said a user at a large Seattle-based company who requested anonymity.

"Why would you move to [Linux] with effectively no support, running a Web server that doesn't have as much functionality [as IIS]? There's a hidden cost of ownership in that model as well," he said.

Tightening Server Security

Beefed-up security after the Code Red worm and the availability of a cumulative patch from Microsoft has improved the security of IIS servers.

Vulnerability of IIS sites this year vs. last year:

	OCTOBER 2000	AUGUST 2001
Administration pages accessible	27.38%	10.26%
Cross-site scripting	80.95%	19.23%
Server paths revealed	50.60%	6.41%
Viewing script source code	19.64%	3.85%

SOURCE: NETCRAFT LTD, BATH, ENGLAND

Quick Link: For more information on this topic, head to our Security Knowledge Center.
www.computerworld.com/q?k1600

Government Boosts Technology Research

Projects may help private-sector IT

BY PATRICK THIBODEAU
WASHINGTON

The Bush administration has significantly increased spending for IT research projects, awarding $156 million in grants last week to seed ideas that may ultimately help corporate IT organizations.

One such project, which received $5.5 million from the National Science Foundation (NSF), is intended to reduce the typical 10- to 30-year span before new algorithms find their way into applications, according to Guy Blelloch, a computer science professor at Carnegie Mellon University in Pittsburgh. Businesses use algorithms extensively in optimization, for purposes such as developing efficient scheduling of airline flights and trucking routes.

"The smarter the algorithm, the better you can get the schedules," said Blelloch.

But there's currently a disconnect between application developers and algorithm researchers, said Blelloch, who's heading the project. "It's really a communications gap," he said. A large part of the grant is aimed at bringing researchers and application developers together through such activities as workshops.

The NSF, a federal agency that funds basic scientific research, awarded $90 million in IT research last year. The Bush administration has made technology research a priority.

"Our objective is to support the development of software and IT services that will help scientists and engineers make the kinds of discoveries that will eventually be applied by industry," said Rita Colwell, director of the NSF.

One of the larger awards — approximately $7.5 million — is to fund an ongoing project at the University of California, Berkeley. That project is designed to create a broad-based computer network that would, among other things, use sensors to optimize automobile traffic flow and provide real-time information on the conditions of roads, bridges and buildings after an earthquake.

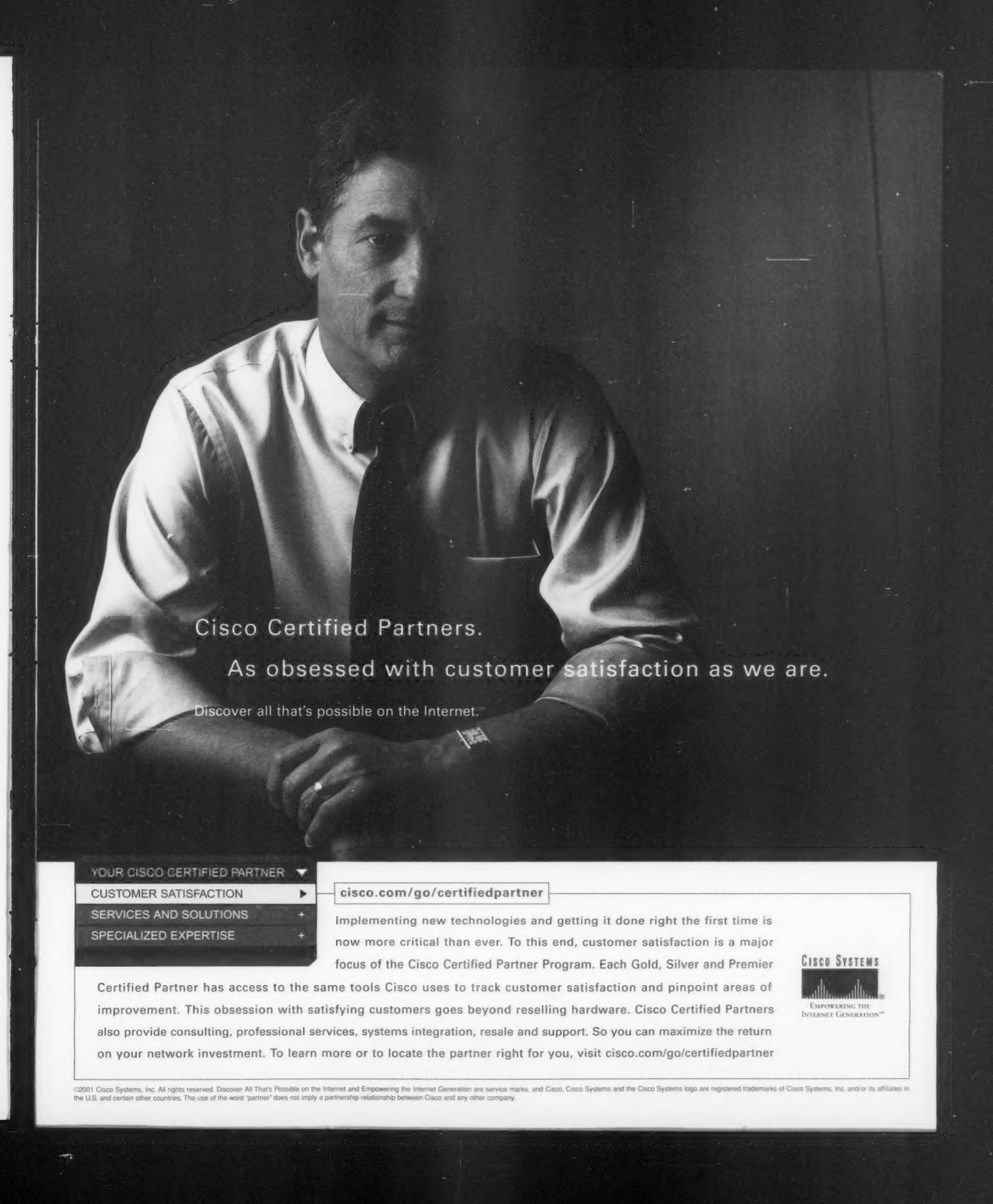
Another Carnegie Mellon project that received NSF money — in this case, a $1 million grant over two years — aims to develop new ways to verify the reliability of embedded systems.

"Obviously, the reliability of such systems is extremely important," said Edmund Clarke, a professor of computer science and lead investigator at Carnegie Mellon. The goal of the research is to verify the reliability of software and hardware used in such systems as they are designed, he said.

Role of the NSF

The National Science Foundation is a federal agency that funds basic scientific research that's too risky and expensive for companies.

- The NSF this year received more than **2,000 proposals** for funding. It awarded **309**.
- The NSF hopes to award **$217 million** next year.



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Fidelity Makes Big XML Conversion

Retrofit of legacy data leads to massive reduction in hardware, proprietary code

BY LUCAS MEARIAN

THIS MONTH, Fidelity Investments expects to complete a retrofit of its corporate data to an XML format in an effort that has already allowed it to gut a significant amount of hardware, proprietary databases and Web and transactional protocols. Analysts say the project is the largest of its kind and estimate that it could cost the investment firm tens of millions of dollars.

"When looking at the multitude of data required to be made XML-compatible within an institution the size of Fidelity, it's mind-boggling," said Sarah Ablett, a research analyst at Meridien Research Inc. in Newton, Mass.

Two years ago, Fidelity started looking for a way to simplify communications between consumer Web applications and back-end systems. During the past decade, the Boston-based mutual funds giant had installed a plethora of proprietary messaging formats, remote procedure calls, interfaces and commercial middleware applications, such as Sybase EnterpriseConnect.

By using XML as its core communications connection to translate data among its Web site, its Unix and Windows NT servers and its back-office mainframes, Fidelity was able to eliminate a glut of translation protocols and message buffers and 75 of its 85 midtier servers.

Bill Stangel, XML team leader and an enterprise architect at Fidelity, said a common language has also allowed the company's IT managers to redeploy programmers, who were tied up writing interfaces, to work on more important business functions. The conversion should also improve time to market for applications, he said.

"It's simplified our environment significantly," Stangel said. "Instead of us having to invent our own messaging, we can now use XML as the common language. We can buy a book on it and give it to our programmers and say, 'You can use this instead of inventing a new interface.' "

Getting the project off the ground was difficult, said Stangel, "but once the culture kicked in, we didn't have to explain why XML is a good thing.

"People picked up on it and realized if we can reduce the complexity of our systems, we can have a real [competitive] advantage," he said.

While it's not unusual for financial services firms to develop XML formats for future or even current information, it's somewhat rare for a company to spend the amount of money Fidelity is believed to have invested to retrofit all of its internal information, said Neal Goldman, an analyst at The Yankee Group in Boston.

Fidelity officials declined to comment on the specific costs or savings associated with the project.

Several XML standards compete in the financial services industry, including Financial Information Exchange (FIX), a protocol used by a group of asset management and brokerage firms for the real-time exchange of securities transactions. Currently, FIX developers must write application-level code to validate the structure of FIX messages.

Instead of going with one of several proposed XML standards, Fidelity settled on its own proprietary version of XML because of the early adoption of the technology and the fit with its investment business.

As Fidelity looks to convert its external systems to XML, Stangel said, the firm will consider evolving standards such as FIXML for FIX messages or RIXML, which makes it easier for investors to share information about companies.

"Our work upfront has put us in a good position to now take advantage of these next-generation [XML standards] as we move forward," Stangel said. "We probably won't move to one of the tag standards, like ebXML. That doesn't fit our business. But we will take advantage of the next part of that protocol, schema structures and those types of things, instead of us having to invent those components."

Addition by Subtraction

Here's the upshot to Fidelity's XML conversion project:

- Programmers now have to learn only **one language** instead of many proprietary languages.
- Programmers busy writing interfaces can now **focus on business functions**.
- Cuts out **75 of 85** midtier servers.
- **Cuts many proprietary translation protocols** and message buffers between Fidelity's Web and back-end systems.
- Improves the company's **time to market** for applications.

Note: Fidelity said it expected to spend $2.3 billion on technology this year. That figure includes $350 million for Internet development, a 35% increase over last year.

Siebel Readies Web-Based CRM Suite

Some users cautious about upgrading

BY MARC L. SONGINI

At its annual user conference this week in Chicago, Siebel Systems Inc. is expected to showcase a fully Web-architectural version of its flagship customer relationship management (CRM) software.

Users and analysts said the Siebel 7 technology will take center stage at the Siebel Worldwide User Week 2001 conference. Siebel officials couldn't be reached for comment last week, but the San Mateo, Calif.-based vendor has said that the new release won't require client-level software and will add several features that aren't available in its current Siebel 2000 suite.

While some Siebel users said last week that they see the potential advantages of upgrading their CRM systems to Siebel 7, they also expressed a degree of caution about making the move.

Just how the new version will integrate with back-end systems and other business applications is of particular interest to Greg Augustine, director of e-commerce at TidalWire Inc., a Westboro, Mass.-based maker of storage hardware. TidalWire uses the Siebel 2000 sales application to handle account management, customer leads and other functions.

Augustine said there would be benefits to using the new release, such as easier maintenance for IT workers and the availability of enhanced reporting tools for end users who want to review customer records. But there are also "costs associated with migrating from one version to another," he added. "And this is a major upgrade, so we'll be doing lots of changes." For example, he said, changes in business processes would be needed.

It's likely that Siebel will offer special upgrade programs and technical help in an effort to migrate Siebel 2000 client/server customers to the new Web-based architecture, said Erin Kinikin, an analyst at Giga Information Group Inc. in Cambridge, Mass.

But companies should do their usual due diligence and not be too hasty to jump to Siebel 7, no matter how hard the vendor pushes the product, Kinikin said. Users "need to be cautious . . . before kicking off large Web CRM deployment projects," she said.

Another user who's looking at Siebel 7 is Ken Casey, vice president of operations at Alberta Treasury Branches, an Edmonton, Alberta-based bank that went live with a Siebel 2000 call center application for the financial industry in July.

The bank now wants to roll out the call center package to its branch offices but is looking to avoid the cost of installing client software on every desktop, Casey said. Instead, the company hopes to rely on a central server that offers browser-based access to the application for remote users.

"We decided the next level of the rollout wouldn't have the same thick-client technology [as the initial project required]," Casey said. He said he's also interested in a new bank-teller application that's supposed to be part of Siebel 7. The bank is leaning toward upgrading but hasn't made definite plans to do so.

Quick Link For access to additional resources online, visit our CRM Knowledge Center.
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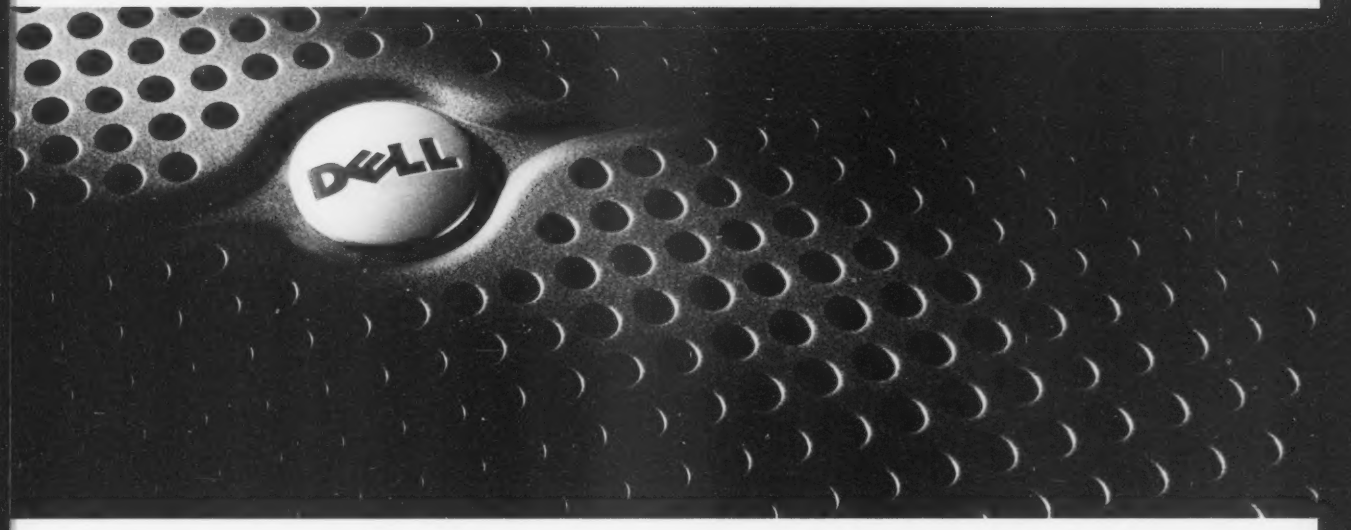

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BRIEFS

Exodus Files for Bankruptcy Protection

Web hosting firm Exodus Communications Inc. filed for Chapter 11 bankruptcy protection following a series of losses, layoffs and management shake-ups. But the Santa Clara, Calif.-based company said it will continue operating, using $200 million in new debtor-in-possession financing from General Electric Capital Corp. in Stamford, Conn.

Six More States Call For Antitrust Remedy

Six states that aren't taking part in the U.S. government's antitrust case against Microsoft Corp. released an open letter calling on the software vendor "to remedy the antitrust problems that are now evident." The letter also raised antitrust-related concerns about Microsoft's new Windows XP operating system.

Ariba Rolls Out B2B Product-Sourcing App

Ariba Inc. announced a new business-to-business application that includes automated contract management, supplier negotiation and spending analysis features for buying products and services.

Unlike the Sunnyvale, Calif.-based company's earlier sourcing products, the Ariba Enterprise Sourcing software can be installed internally in addition to being run in hosted setups.

Short Takes

APPLE COMPUTER INC. announced an upgrade of its Mac OS X operating system designed to address performance problems and other shortcomings in the product's first release, which shipped in March. . . . WORLDCOM INC. is buying some of the assets of bankrupt Digital Subscriber Line service provider RHYTHMS NETCONNECTIONS INC. in Englewood, Col., for $40 million.

Continued from page 1

Boeing

get on with the business at hand?' "

One possible answer: real-time monitoring of what is going on in the passenger cabins of commercial aircraft.

Condit said Connexion by Boeing, a broadband satellite connection service initially aimed at bringing Internet access and video to passengers in flight, could also be used to send images from aircraft to ground stations.

Boeing spokesman Terrance Scott said that although the Connexion system is still under development, it has been deployed in 11 private business and government jets, including the Boeing 737 corporate jet used by Condit. Boeing also has a special 737 set up to provide ongoing development of the Connexion platform, Scott said.

Several carriers, including American Airlines Inc., United Air Lines Inc. and Delta Air Lines Inc., have said they will deploy the Internet access and video system, although those plans were announced before the terrorist attacks. The idea of the system being modified so it can transmit images from an aircraft to the ground is a new initiative that Boeing is exploring.

A General Trend

Aerospace analyst Mike Burkett at AMR Research Inc. in Boston said the concept of remote monitoring of an aircraft in real time "seems to make perfect sense" from a security standpoint. "Remote monitoring is a general trend in IT," he noted.

According to Scott, the throughput speed from satellites to an aircraft is 20M bit/sec., and 1.5M bit/sec. in the other direction. If a security or mechanical emergency were to arise, bandwidth could be shifted to accommodate the situation, Burkett said.

Condit said Boeing has proposed a different type of satellite-based air traffic management that views multiple aircraft as components in a single system. "It has better data flows and fewer holes [than existing systems]," he said.

As for the job cuts Boeing has already announced, Condit affirmed the company's decision to lay off approximately 30,000 employees during the coming months.

"Flying has decreased dramatically," he said. "Building commercial airliners doesn't make sense unless airlines need them."

But most Boeing IT workers won't have to worry, according to Judith Muhlberg, the company's vice president of communications. She said the layoffs, most of which will be made in the aerospace giant's commercial aircraft operating unit, "will have an insignificant impact on Boeing IT personnel.

"Boeing is still hiring IT people," Muhlberg said. "Those [IT personnel] affected will likely be transferred to other Boeing divisions." ◗

BOEING CEO CONDIT: Broadband could increase aircraft security.

Continued from page 1

Projects

at a cost of $150 million. IBM was to provide the technology for the kiosks and handle the installation.

Last week, United spokeswoman Chris Nardella said those plans "are on hold now," though she added that an undetermined number of kiosks have been installed and continue to function in Chicago O'Hare International, Los Angeles International and San Diego International airports.

Nardella said United hasn't yet decided whether it will install more kiosks and what changes, if any, will be made to them to ensure security.

The kiosks were intended to speed check-in for travelers with e-tickets, who can insert a United frequent-flier card or major credit card for identification and get back a printed boarding pass. Now, United will have agents at the security checkpoints to double-check that the name on the ticket matches the photo ID of the ticketholder, Nardella said.

By and large, the Federal Aviation Administration is leaving these kinds of security details to the discretion of individual airlines, and there are no plans to prohibit the use of kiosks for travelers, said an FAA spokesman. "The important thing to us is that people have the proper documents to get through the screener checkpoints," he said.

IBM has contracted with several airlines to install self-service kiosks. US Airways Group Inc., British Airways PLC and Air Canada have all signed deals with IBM, as did Ansett Airport in Sydney, Australia, and Inchon International Airport in South Korea.

Kiosks aren't the only technology that could be affected by new guidelines. "The entire airline industry evolved as an extension of their electronic networks and the networks' message structures and the quasi-automated e-commerce processes that evolved in and around them," said Richard Eastman, president of The Eastman Group Inc., an airline industry consulting firm in Newport Beach, Calif. "What Sept. 11 has done, in my mind, is open some doors to a new architecture model."

AIRPORT KIOSKS LIKE this one from United are already in use, but their future is in doubt.

For starters, he said, reservation systems aren't set up to trigger an alarm if, for example, a large number of passengers don't show up for a flight or if a handful of passengers buy last-minute tickets at full fare. They are only inventories, not relational databases, and they can't do event-based functions, he said.

For its part, IBM doesn't have any specifics on how the new security guidelines will impact its various contracts with the airlines. "We're working with our customers, [but] it's hard to be more specific," said IBM spokeswoman Linda Hanson. "Obviously, there is some refocusing."

Robert Denahy, director of marketing for mobile printing at Zebra Technologies Corp. in Vernon Hills, Ill., said he sees a need to refocus his company's mobile printing technology that's used for curbside check-in and by roving agents to check baggage. For now, Denahy isn't sure if Zebra's labeling technology will help with airport security or need to be retooled to support more sophisticated security practices.

"A lot of these changes and a lot of these issues are uncertain," Denahy said. For example, Zebra's mobile printers could link baggage to passengers and their identification with the bar-code technology already in use. Zebra might also have to consider embedding biometrics into the bar-code information on baggage and boarding passes, he said. ◗

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Feds Build SANs to Handle Increasing User Demands

Government agencies are forced to centralize servers as they attempt to meet growing needs

BY LUCAS MEARIAN

ONGOING PROJECTS at two federal agencies illustrate the public and private sectors' increasing need for storage-area networks (SAN) in response to growing demands from end users and customers for access to information.

Two weeks ago, the U.S. Geological Survey (USGS) got an upgrade to the SAN behind its Web site. The SAN, hosted by Microsoft Corp. and known as TerraServer, had its capacity bumped from 12TB to 18TB to better serve an audience that makes more than 5 million imagery requests per day.

Each time the site is publicized on television or in print, the number of visitors skyrockets. On top of that, a new Web site was added to the TerraServer to give federal agencies exclusive use of the data to create presentations.

The USGS's Web site, which can display more than 3 million satellite photos of Earth, is most often used by the general public and the U.S. Department of Agriculture for the management of land and other natural resources.

The TerraServer project is a joint venture between the federal government and various IT vendors, including Microsoft, Compaq Computer Corp. and Redmond, Wash.-based Advanced Digital Information Corp. (ADIC).

TerraServer uses three Microsoft SQL Server databases, four Compaq ProLiant 8500 servers, one Compaq Enterprise Storage Array 12000 and 12 16-port SilkWorm 2800 switches from Brocade Communications Systems Inc. to store aerial and satellite images of Earth and to provide the information publicly on the Internet.

When the project first started in 1997, "we were basically exploring how large we could grow a single server," said Tom Barclay, TerraServer project manager at Microsoft.

The project grew from that single server into a 25-ft.-long computer with eight racks of equipment. Then disk capacity topped out, and the USGS decided that it wanted its data to be available via the Web around the clock.

The need for multiple servers in an active configuration — combined with the ability to move multiple terabytes of data from one server to another — "was the motivation to move to clustering," Barclay said.

"On the Internet, predicting user load becomes so much more challenging," he explained. Anyone who's building an application "has to configure on the high side for bandwidth, considering you can literally have every man, woman and child in the world standing outside your door."

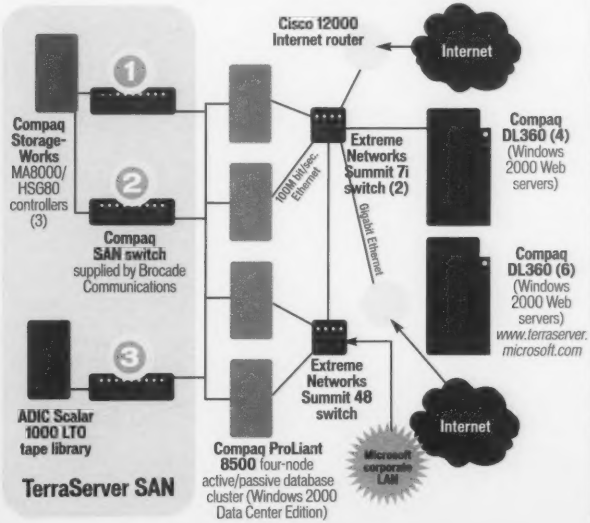
In another example of SAN technology making federal inroads, the Federal Deposit Insurance Corp. is in the midst of a two-year server consolidation project aimed at pumping its data into two SANs so it can upgrade to Windows 2000 and make information available to scores of field offices.

The FDIC, the federal entity that insures customer deposits at almost 10,000 U.S. banks, was faced with replacing the hard drives in about 400 servers that it uses for internal operations. It had been adding servers to support data-intensive applications like Microsoft Exchange.

"At the same time, we were also looking at budget considerations. We wanted to consolidate servers and centralize them," said Ann-Marie Haynie, a senior computer specialist at the FDIC in Arlington, Va. "If we have the servers centralized, we can actually start clustering them more efficiently for redundancy and fail-over."

How It Works

The Microsoft TerraServer is at the back end of the U.S. Geological Survey's Web site, which hosts more than 3 million satellite photos of Earth. One of the goals of TerraServer is to demonstrate that a highly available and scalable configuration can be built using commodity hardware running Microsoft software.



FCC Preserves Operators' Spectrum Rights

BY BOB BREWIN

The Federal Communications Commission has ruled that companies such as WorldCom Inc. and Sprint Corp., as well as educational institutions nationwide, don't have to give up their frequency spectrum to accommodate new, high-speed mobile services.

But the FCC decision, made Sept. 6 but announced last week, could hamstring the cellular telecommunications industry's search for spectrum in the near future. That's because U.S. Department of Defense (DOD) frequencies, also under consideration for commercial third-generation (3G) wireless use, are now considered inviolable, given the nation's current defensive footing.

The cellular industry had a sharp reaction to the FCC spectrum decision. Tom Wheeler, president of the Cellular Telecommunications & Internet Association (CTIA) in Washington, said the decision "does not help to address the continuing need for additional spectrum for the most spectrum-contained carriers."

The FCC said in its ruling that it won't force companies such as Sprint and WorldCom, which paid billions of dollars for licenses in the 2,500-to-2,690-MHz band, to move. The decision removes "regulatory uncertainty" that had stalled deployment of broadband wireless services designed to bypass local telephone companies, said Andrew Kreig, president of the Washington-based Wireless Communications Association International.

Last year, the federal government also targeted for potential 3G uses the 1,710-to-1,850-MHz band, which is used extensively by the DOD, and the CTIA has led a fierce lobbying battle for those frequencies. Any chance of the cellular industry gaining access, however, has largely evaporated since the terrorist attacks on Sept. 11, said analysts and former DOD officials.

"No one is going to argue about DOD needing that spectrum today, and I don't think anyone wants to take away that spectrum now," said John Hamre, deputy defense secretary under the Clinton administration and now president and CEO of the Center for Strategic and International Studies in Washington.

According to Craig Mathias, an analyst at Farpoint Group in Ashland, Mass., the ruling that walls off the 2,500-to-2,690-MHz band, combined with the political realities that will prevent any encroachment on the DOD's 1,700-to-1,850-MHz band, means that the cellular industry "is up the creek" in its search for new spectrum to support 3G services.

BRIEFS

Intel Names CTO

Intel Corp. last week tapped Patrick Gelsinger as its first companywide chief technology officer. Gelsinger will head the company's new Corporate Technology Group and will report directly to Intel President and CEO Craig Barrett. The group will provide research and technology direction across product lines and create industry specifications, standards and technologies.

VeriSign Buying Illuminet For $1.2B

Digital trust services vendor VeriSign Inc. in Mountain View, Calif., is acquiring Lacey, Wash.-based Illuminet Holdings Inc. in a move to expand its offerings beyond the Internet. VeriSign said the acquisition will help it offer digital identification, transaction security and other services to Illuminet's telecommunications customers.

Gateway to Drop AMD For Intel Chips in PCs

Sunnyvale, Calif.-based chip maker Advanced Micro Devices Inc. saw things go from bad to worse last week. On the same day the company announced it would lay off 2,300 employees, PC vendor Gateway Inc. in San Diego said that once its current stock of AMD-based PCs is depleted, the company will standardize on Intel processors.

Short Takes

CISCO SYSTEMS INC. and San Mateo, Calif.-based E.PIPHANY INC. said they're bundling a variety of their software products in an effort to make customer contact centers smarter. . . . SAP AG said it's creating a unit to meet the consulting needs of multinational customers. . . . SGI JAPAN LTD., the Japanese unit of SILICON GRAPHICS INC., signed an agreement with NEC CORP. that calls for more cooperation and a future capital tie-up between the companies.

Sun Raises Stakes With 72-Processor Server

Release improves position against IBM

BY LEE COPELAND

SUN MICROSYSTEMS Inc. has added more horsepower to its UltraSPARC server lineup, a move analysts said bolsters its dominance of the Unix market and boosts the company's competitive position against rival IBM.

Sun launched its long-awaited Sun Fire 15K, code-named Starcat, last week. Unlike its predecessor, the 64-bit UltraSPARC II E10K machine, the Sun Fire 15K supports as many as 72 processors and 18 I/O hubs, company officials said. By substituting those I/O hubs for CPUs, users can boost the server's processing power to 106 chips.

The Sun Fire 15K offers new options to Sun's customer base, said Steve Josselyn, an analyst at Framingham, Mass.-based IDC.

"Customers had been waiting for quite some time for the UltraSPARC III chip, and this is the delivery of that. Having 72 processors gives them additional headroom," he said.

Ed Broderick, an analyst at Robert Frances Group Inc. in Westport, Conn., said the server will also help Sun compete for non-Unix customers, such as those with IBM's RS/6000 midrange servers and s390 mainframes.

"Sun is taking dead aim at IBM," Broderick said. "This is a case of Sun getting more sophisticated in its capabilities and maturing, and Sun is coming on like gangbusters."

The worldwide Unix server market reached $29 billion last year, according to IDC. Sun led the pack with a 35% market share, followed by Hewlett-Packard Co. with 23%, IBM with 18% and Compaq Computer Corp. with 8%

But in the worldwide high-end server market, which includes high-end Unix machines and mainframes and totaled $12 billion last year, the leadership roles are reversed, IDC said. IBM holds 36% of that market, followed by Sun with 18%, Compaq and Tokyo-based Fujitsu Ltd. with roughly 8% each and HP with 6%.

The Sun Fire 15K will be available in four configurations, ranging from a 16-processor model, which costs about $1.4 million, to the 72-processor model, with a price tag of about $4 million, Sun officials said.

The new box, built by Dallas-based Texas Instruments Inc., also sports 900-MHz copper-based chips and embedded memory controllers.

Sun's Solaris 8 operating system is required for the new hardware.

Sun has sold about 5,000 UltraSPARC II E10K machines since March 1997 at an average price of $1 million each, said Clark Masters, vice president and general manager of enterprise system products at Sun.

While Sun hopes to maintain that sales track record with the Sun Fire 15K, analysts cautioned that the high-end server market has slowed down this year.

"It has certainly become a buyer's market for any high-end system," said Brian Richardson, an analyst at Meta Group Inc. in Stamford, Conn. "Last year and in 1999, it was still a seller's market because of Y2k-driven Web-enabling of legacy applications. IT budgets are tighter this year."

AT A GLANCE

Starcat Powers Up

The Sun Fire 15K includes the following features:

- 72-processor configuration and 18 I/O hubs
- 106-processor capacity, if additional CPUs get substituted for I/O channels
- 900-MHz copper-based chips and embedded memory controllers
- $1.4 million starting price for 16-processor configuration
- $4 million price tag for 72-processor configuration

Microsoft Considers Joining New Liberty Alliance Project

Passport ID system might operate with open technology

BY ASHLEE VANCE

Microsoft Corp. will consider joining a newly formed coalition working on digital identity technology similar to its Passport system if coalition vendors, including rival Sun Microsystems Inc., show a commitment to keeping the identity platform open, said a Microsoft official last week.

Sun and about 30 other companies launched the Liberty Alliance Project on Sept. 26, hoping to lay the foundation for a new type of authentication system that would allow user information, such as credit card numbers, to travel securely between Web sites. The system would be similar to Microsoft's Passport technology, saving users time by asking them to fill out name or credit card fields on a Web site once and then having that information pop up automatically on other sites that support the technology.

One of the differences between Microsoft's system and that of the Liberty Alliance is where end users' information would be stored. The alliance members would each store a user's information on their own servers, with the information passing from vendor to vendor when the user moves to a new site. Microsoft, by contrast, stores all Passport information only on its servers. However, Microsoft said last week it would consider letting a third party manage the data.

Sun and others in the coalition suggested that Microsoft could become part of the alliance, making Passport a subset of a digital identity standard — an idea that Microsoft hasn't dismissed and that could prevent conflicts between the two systems.

"If they are sincere [about an open platform], there's probably an opportunity for us to work together here," said Chris Payne, vice president of marketing for the services platform group at Microsoft. "I don't see it as a competitive announcement."

Sun and its partners seem amenable to having Microsoft and New York-based AOL Time Warner Inc. work together on the technology. Executives from Sun, RealNetworks Inc. and Bank of America Corp. extended their invitation publicly to Microsoft and AOL Time Warner when the alliance was launched.

Microsoft had already taken a more open stance with Passport, saying it would work to make its system interoperate with competing technology more easily.

Such openness could benefit users and vendors alike.

"I think more and more people are now realizing that a unified user identity system is very useful," said Dana Gardner, an analyst at Aberdeen Group Inc. in Boston.

Vance writes for the IDG News Service.

PATRICIA KEEFE

IT in the Crossfire

THE SUMMER after the U.S. bombed Libya, I flew into France on business in a nearly empty plane and landed in laid-back Nice, where customs was nonexistent. It was a different story flying out of Paris. Soldiers with machine guns were everywhere, check-in was time-consuming, suitcases were opened, electronics were turned on, and random checks were frequent. In the packed terminal waiting area, Arab passengers were viewed with suspicion. A woman sitting behind me played a chilling game with her son: "You tell me who you think the terrorists are, and I'll tell you who I think they are."

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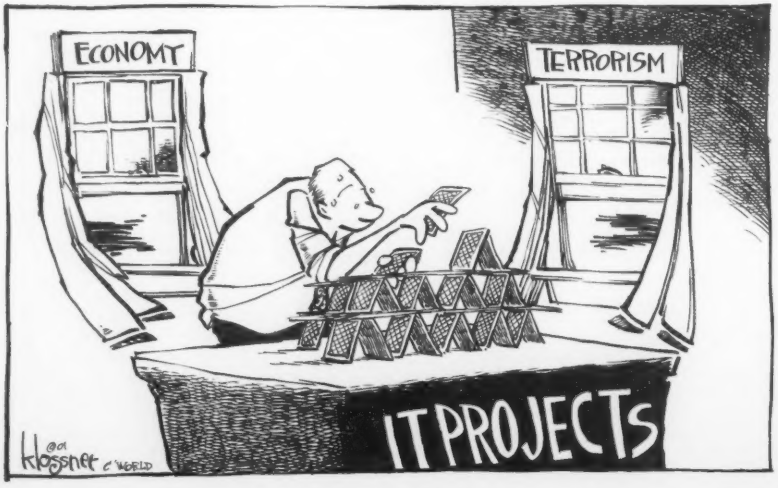
On another business trip — this time to British Telecom in London — we were subjected to metal and gunpowder searches every time we entered the BT building, even though we had been invited. Flying out of Heathrow was more of the same, only this time, I became the subject of random checks — so frequent I stopped putting my passport and ticket away.

Now, as we gingerly begin to rebook travel, we all know the process of traveling is going to change in a big way. Much of this is good — airline security in this country is a joke.

But recent moves by law enforcement to gain unfettered access to data that is created, collected and stored electronically should worry you. Whether it's wiretapping, transaction or credit histories, e-mail logs or tracking clicks, IT is at the center of this debate. Remember the ethical debates over the e-mail police? Or the hue and cry that arise over any attempt to sell customer data collected under the promise of privacy?

If some policymakers have their way, anyone charged with collecting, storing or mining data or with administration of e-mail lists and customer demographics could be asked to produce that information at any time. And that's the scary part, because America is what it is, and we are who we are, precisely because of our openness and many freedoms. If we trample civil liberties into the ground, then terrorism wins.

This isn't a time to lose our heads; it's a time for reasoned discussion. Whether you find yourself on a development team creating the technical means or on the front end, controlling access to the data, speak up: You can help shape this policy. It's now or never.



PIMM FOX

Get Serious About Getting Prepared

MENTION San Francisco, and people think earthquakes. They ask what we do to prepare for life on a fault line. Unfortunately, the answer is, "Not much."

In 10 years, San Francisco has never had a citywide emergency drill, nor a corporate exercise for large-scale disasters, either for people, IT operations or communications.

This has to change.

Many firms don't have fire hoods, flashlights or light sticks as part of their standard emergency kits. Some don't have floor wardens trained in emergency procedures.

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Of course, obvious plans for IT involve backup of critical data off-site.

"A large number of businesses at the World Trade Center didn't have off-site storage of critical business data," says Neil Livingstone, chairman and CEO of GlobalOptions LLC, a risk-management firm in Washington.

"You have to have appropriate data storage, and that means not having it in the same building," Livingstone says. Even companies with sophisticated backup systems didn't operate them on a nightly basis. "The Securities and Exchange Commission is confronting a situation in which some paper material had yet to be backed up," he says.

Similar to the paper strewn all over the blast site in Manhattan, electrons from transactions taking place at the time of a disaster — bank transfers en route — would be wiped out, unless the operations had built-in redundancy.

Another area for IT preparedness concerns laptops. Knowing what's on laptops that get lost, stolen or destroyed is critical to reconstructing IT infrastructure. Many people keep information without a backup to a secure (and redundant) server. Backups to Orb or Zip drives don't count.

On a strategic level, companies need a crisis-management plan that doesn't sit on the shelf. This plan should outline the duties and responsibilities of employees, especially senior management. It delineates who talks to the press, who talks to customers and who is tasked with IT and human resources responsibilities and lists key

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telephone numbers of emergency personnel.

"A plan not tested is worse than useless," says Livingstone. "It has to be tested to identify deficiencies, and senior management needs to take it seriously."

Even companies with IT operations in so-called safe havens will still do business where a disaster can strike and need to have recovery plans for the unsafe world around them.

With U.S. military retaliation an ongoing option, additional terrorist action is likely. Executives who hesitate to prepare should ask, "What's the cost of losing the business?"

We're all on a fault line now. ◗

THORNTON MAY

Info Security 'Teachers' Need More Learning

A LONGTIME editor of *Scientific American* recalls meeting a famous movie critic. After introducing themselves, the movie critic said she knew "absolutely nothing" about science. The editor responded, "Whatever became of the idea that an educated person is supposed to know a little something about everything?"

It has become common knowledge that all stakeholders in the enterprise should "know a little something" about information security and privacy. The first two questions toward making our systems secure are, "How much do executives really need to know?" and, "How many companies have developed a 'curriculum' detailing what specific business leaders, in specific business roles, need to know?" In conjunction with scholars at Arizona State University's College of Business, Guardent recently conducted a survey of 120 top-level executives. It turns out that less than 10% have or manage a security or privacy curriculum geared toward different information-handling responsibilities.

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Security professionals insist that better education of business executives is needed. They're right, but while they think they should be the teachers, they really should be the students first. At first glance, writing down what must be known about security and privacy and who needs to know it appears to be pretty basic. But security and privacy professionals appear unable to put the security and privacy to-dos in the proper context for people who manage sensitive information. Why? Security people have never been known to distinguish themselves with dazzling feats of writing. Dostoevski and Tolstoy were pithy compared with contemporary security and privacy policy writers. So, the first lesson at security school should be basic writing skills.

Then there's the "bedside manner" of security and privacy professionals. They tend to be very good at telling us what's wrong and what's broken, but most of them are mute when it comes to actually fixing the problem. Lesson two at security school: how to play constructively with others. Security experts have to stop being judge/jury/cop and start being therapist/counselor/creative problem-solver.

Most security professionals would benefit from a bit of advice from journalists in the do's and don'ts of telling a good story. Executives of the future won't tolerate messages that aren't highly relevant to them and will filter them out. So, lesson three is storytelling.

Assuming that the security curriculum has been created and taught, the third question becomes, "Has the organization tested various audiences against that curriculum?" Again, we find that less than 10% do so.

The all-important final exam question is, "When executives know what they need to know, does that knowledge change their behavior?" We asked the 120 executives, "Do you think it will be best for the future of your company if senior executives like you played a more active role in designing and implementing information security and privacy programs?" Ninety-one percent answered yes.

Three months later, we returned to that 91% and asked, "Have you become more active in designing and implementing information security and privacy programs?" Ninety-five percent said no. Executives endorse the theory and concept of security and privacy, but they don't walk the walk.

What this tells us is that most companies' information security organizations wouldn't receive passing grades in trying to upgrade enterprise awareness of what each employee needs to know and do to render their systems and the data housed in them secure. ◗

READERS' LETTERS

Some Travel Needed

FOR INTRACOMPANY meetings where a structured relationship exists for responsibilities, videoconferencing works fine ["Avoiding Travel, Users Turn to Communications Technology," *Computerworld.com*, Sept. 24]. But for sales and new project implementations, the processes of interviewing, training and start-up will work only when you are face-to-face with the customer.

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Valuing Privacy

SECURITY CANNOT be had without privacy ["Information Security Will Be Key With Lawmakers," News, Sept. 17]. If citizens and corporations aren't allowed to choose and control what information is visible and to whom, including choosing what is and is not visible to the government, then none of us is secure.

Why on earth would we believe that it's always safe for government officials to be able to snoop in every single aspect of our lives? Why would we assume people are guilty until proven innocent if they simply wish to control their own extended information shadow? I beg of organizations like the Association for Computing Machinery that they recognize the incredible threat of total government surveillance and speak against it.

Samantha Atkins
San Jose

Just-in-Time Layoffs?

YOU WOULD have to be pretty naive to believe that Boeing is laying off 30,000 workers as a result of the terrorist strikes on Sept. 11 ["Boeing to Lay Off up to 30,000 Workers," *Computerworld.com*, Sept. 19]. The buying cycle on airplanes is quite lengthy, and a slowdown in Boeing's commercial plane operations has been coming for months. It's frustrating to see so many laid off, but don't give the terrorists so much credit.

Ryder Todd Smith
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Nimda Cure Too Strong

IN THE SEPT. 24 article "Nimda Needs Harsh Disinfectant" [Page One], you state that the CERT Coordination Center and the SANS Institute both recommend that "until more sophisticated fixes become available, the only sure course is to disconnect all infected systems from the network, reformat their hard drives, reinstall all the software from a secure source and apply the appropriate security patches." This is not a correct statement.

There are several programs available that automatically clean and remove the virus from the infected server or workstation without having to reformat the hard drives and reinstall all software. Check out the following link from Trend Micro: *www.antivirus.com/vinfo/virusencyclo/default5.asp?VName=PE_NIMDA.A.*

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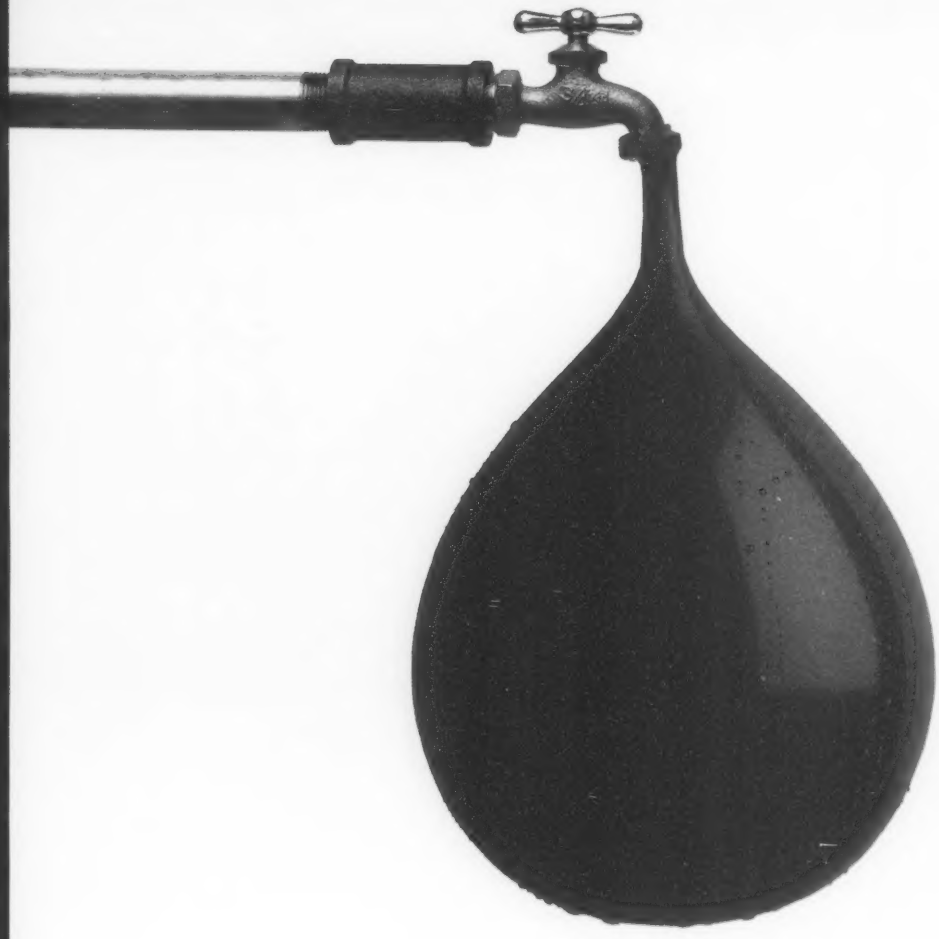

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THIS WEEK

HOME IMPROVEMENT

When Jean Holley joined USG as its first CIO three years ago, she was charged with reconstructing a legacy-bound IT infrastructure, updating an IT staff that had 1970s-era skills and forging a closer partnership with untrusting business units. **PAGE 24**

DANIEL LEVIN

THE DOT-COMEBACKS

Many IT managers, like Longaberger CIO Cynthia Hilliard (above), are rehiring staffers previously lost to dot-coms and trying to establish the kind of perks that lured them away in the first place. **PAGE 28**

SPEEDING DELIVERY

Ford and UPS are six months ahead of schedule in achieving productivity gains from a system that's designed to make car and truck deliveries faster and more predictable. **PAGE 30**

HOW WE'LL WORK

The IT workplace is experiencing tremendous change in the wake of dot-com mania — including more casual work environments and a trend toward telecommuting — but not all IT managers or staffing experts think those changes are for the better. **PAGE 34**

PAUL A. STRASSMANN

Secure the Internet

HOW WILL LAST MONTH'S TERRORIST ATTACKS affect corporate IT? Hijacking and crashing four jetliners was only one move in a concerted campaign to disrupt global commerce, damage U.S. economic interests, erode U.S. power and foment distrust in the conduct of international business. Given those objectives, I'm quite sure that high on terrorists' checklists is a plan to wreck the Internet. If they can stop Internet traffic for a day or two, the effect on business, and particularly on the future of IT, would be devastating.

Current configuration and management practices for securing the Internet are roughly comparable to what has so far passed for airport security measures. Communications protocols were designed for cooperative ease of use, not security.

The software that runs the servers possesses known security holes through which increasingly virulent attacks are launched every day. The software that operates our desktops has been designed for convenience and is readily exploited by available attack tools. A large portion of more than 100 million powerful PCs and more than 10 million servers can, in an instant, be commandeered to serve as engines that amplify anything terrorists launch, guaranteeing their anonymity and becoming weapons of mass corruption of Internet services. Thus, an IT network that's negligently managed and known to be insecure becomes part of the terrorist's arsenal in information warfare.

All IT assets in the U.S. should now be seen as operating in a war zone.

What could we see in this war zone? The most probable scenario is an attempt to collapse the Internet through a massive denial-of-service attack. One can begin when malicious code is implanted in unprotected computers or when the attacking code sneaks past defenses unrecognized. The infected host is then induced to pass the attack package to others. Damage is inflicted by all compromised computers, which become generators of a huge volume of messages and make all other systems inaccessible by overloading networks with useless traffic so that legitimate users can't access Internet resources. When that happens, operators must disconnect the infected devices, and often, they must also reformat their drives and reinstall all software from a secure source.

That would fit a terrorist's idea of a perfect crime. Just like the attack on the World Trade Center, the target contributes to the spread of damages. The recovery processes magnify the victims' suffering. Meanwhile, an affected information system remains inoperable, and the personnel who depend on it are unable to work. Even if an attack fails, the terrorist wins because he can learn from each failure. Attacks are cheap and almost impossible to prevent, and damages can be enormous. That's why defending the Internet's integrity should be a public priority.

The Internet's current vulnerability is largely the result of gaping holes in the design of operating systems that power servers. Vendors will offer "patches" to plaster over known cracks but will never fix the systems' architectures. That's why you receive one patch after another, each covering yet another variant of the same vulnerability. When you're operating in a war zone, you can't tolerate such conduct, because you could unwittingly become an accomplice to cyberterrorism. The solution lies in mandating government testing, certification and standards, just as prescription drugs, automobiles and buildings are regulated to assure public safety.

The Net's vulnerability is the product of sloppy IT practices. Today, even driving a car or operating a bulldozer requires formal training, an examination, certification and adherence to codes. IT, which has become the lifeblood of America in the past 30 years, leaves network operations to individuals who have no legal accountability. In the information war zone, you can't tolerate such leniency.

The freewheeling, undisciplined days of network management practices are over. If your organization is connected to the Internet, IT must assume the added responsibility of blocking access by information terrorists.

PAUL A. STRASSMANN (paul@strassmann.com), former director of defense information at the Pentagon, has been lecturing on information warfare at the National Defense University since 1994.

As the first CIO at USG, a 100-year-old construction materials company, Jean Holley had to pour a new IT foundation. By Kathleen Melymuka

WHEN JEAN HOLLEY walked into USG Corp. in 1998, it was a little like *The Land That Time Forgot*. As the first CIO in the 100-year history of the Chicago-based building materials company, she had to deal with a 1970s IT infrastructure, a mainframe-oriented technology staff and a limiting service-oriented relationship with the business units. At USG, IT was viewed as an administrative function at best and as an obstacle to progress at worst.

Holley, the company's first female officer and an outside hire in an organization that nearly always promoted from within, was given a mandate by Chairman and CEO William C. Foote to "shake things up." Three years later, it's evident she's done just that.

"We really had a need to bring in someone to elevate the profile of the IT function and to make it more strategically relevant," says Ed Bosowski, senior vice president for marketing and corporate strategy and Holley's boss.

When Holley arrived from Houston-based Waste Management Inc., where she had served as IT director, she found a culture that was resistant to change. "If you started to work here, you could pretty much retire or die here," says Tom Maurice, manager of IT for standards and technology and a 22-year USG veteran. "People would say, 'We've done it this way for 20 years, and that's how we do it.' "

Holley wanted to transform the image of IT among corporate brass as well as on the plant floor. "For our senior executives, all the technical stuff is kind of icky," says Mary Higley, an IT director who was in charge of Y2k preparation when Holley arrived.

But one of her biggest challenges was to erase years of mistrust between the businesses units and IT. "IT used to be difficult to work with," says Tracy Edwards, director of internal audit. "There were a lot of roadblocks and red tape and not a lot of cooperation."

As a result, end users in the 1980s began implementing their own technologies, and "rogue" IT organizations began to evolve within the business units, recalls John Reale, who was then part of such a group in the firm's sales and marketing department. These kinds of IT rebel factions were common among many companies in the early days of the PC, but while most IT organizations eventually reabsorbed the renegades by evolving to PC-based systems, USG never did.

Fixer-Upper

Holley inherited about 100 corporate IT employees who had worked under IT director Bill Duran. But in addition, there were unknown numbers of rogue IT workers and network managers in the 50 plants, which operated independently of corporate IT. Before Holley arrived, there were virtually no standards in place outside the mainframe environment.

The staff she inherited was led by seven male managers, all with computer science backgrounds and 10 to 25 years with the company. "You look at that and wonder how many fresh ideas or different opinions you have," Holley says. "We had a lot of great people that were all the same."

She started by revamping her management team. Duran, a 28-year USG veteran, was joined as IT director by Michelle Cassin, whom Holley had known at Waste Management and valued for her customer-centric perspective. Cassin took over computer services, help desk and support.

Lisa Vrablik, also from Waste Management, was drafted for her enterprise applications savvy. Higley, with 20 years of experience in USG finance, auditing, strategy and Y2k, was tapped as chief strategist. Reale, with sales, customer service, plant operations and rogue IT expertise, was brought over to take on customer-based applications. "This is a very different team from three years ago, when they all looked like Bill," Holley says.

Holley made communications Rule 1, Vrablik says. "So often, people are quiet at a meeting and then they go

AT A GLANCE

USG Corp.

HEADQUARTERS: Chicago

CHARTER: Manufacturer and distributor of building materials, including Sheetrock-brand drywall

REVENUE: $3.8 billion

EMPLOYEES: 13,000

IT EMPLOYEES: More than 150

Note: In June, USG filed for Chapter 11 protection from asbestos lawsuits.

How Did She Do It?

Listed below are some of Jean Holley's accomplishments in attempting to change the corporate culture toward IT

GAINING CORPORATE BUY-IN:

1. Established the CIO as a strategic corporate player
2. Involved senior executives in IT decision-making
3. Forged partnerships with senior business managers

ESTABLISHING IT BUY-IN

1. Diversified IT management team's personnel and outlook
2. Brought rogue IT units under corporate umbrella
3. Developed metrics and clear career paths for IT ranks

Building a Ne

have conversations over the water cooler and you find out what they really think, and then you have another meeting. We don't do that in IT. We don't hold back at all," she says.

For example, at one of Reale's first meetings with the group, he made the mistake of saying, "I'll discuss it with Jean later." Holley recalls that Cassin responded, "Oh, no, John, we don't have a meeting after a meeting. Bring it up now!"

Holley also takes the whole team to conferences or visits to major vendors to gain outside perspectives. "She forces us to go out and work with people in other companies," says Duran. "When you've been focusing on cost for so many years, that's a hard turn, but I find it very refreshing."

One of Holley's goals was to empower the team to act independently. She realized she had succeeded when the directors began meeting without her. "They invite me for my [input], and then they kick me out," she says.

Holley also revamped the IT rank and file from a hodgepodge of 80 job descriptions to three career tracks for technicians, managers and business analysts — a new concept at USG.

Perhaps the most surprising thing she did was allowing the IT renegades to continue to report to the business units. "Especially in a manufacturing environment, managers would hate you if you yanked out their IT people," she explains. Instead, she got to know the business unit leaders and brought their people into her communications loop with no strings attached. "You get to know these people, you share your plans, you learn about theirs, and suddenly they're saying, 'When can I come work for you?' " she says.

Still, it took time for Holley and her team to build trust. For example, Reale, who helped build the sales force automation group outside of IT, helped bring it back into the fold this year. "Jean has eliminated that us-vs.-them approach," he says.

USG Corp. CIO Jean Holley

DAVID JOEL

New Foundations

In USG's manufacturing division, which is hobbled by outdated mainframe systems, Holley and Dom Danessa, vice president of manufacturing, have been laying the groundwork for a new infrastructure — and achieving incremental improvements — by standardizing processes. But the slow pace of change is difficult for both of them. "We're strapped with this old system, and how do you break out of it when you've still got to take orders every day?" Danessa says. "You've got to have a plan and patience."

To establish the CIO position among her executive peers, Holley formed an IT steering committee, which includes the heads of the three main USG businesses. Then she began selling her vision. "IT had always looked at things tactically," she explains. "I have a 10-year outlook with a five-year rolling window and a one-year set of initiatives to get us there. Understanding that and getting on the same page was probably the biggest challenge."

Getting the steering committee to fund major improvements has been a slow process. "There's a little bit of, 'Be here five years, Jean, and then ask for the big bucks,' " she says. "I wanted to go much faster, but I have patience pills in my desk, and I take a lot of them."

Holley demands that the steering committee set the IT agenda. "Every time there's a big project, she makes sure there's a senior executive sponsor, and if no one will raise his hand, then she's not going to do it," says Vrablik.

Holley has established IT metrics around customers, employees and financials, and she's building on IT's successes. Last summer, she staged a "show and tell" for the steering committee to demonstrate some of the small victories she's achieved — intranet job postings, online training and customer self-service initiatives — and to get buy-in for more. She recently got the go-ahead to implement Oracle financials, a big step toward revamping the company's mainframe systems.

Now, Holley is a recognized leader, says Bosowski. "She has made great progress in making IT a key part of corporate strategy," he says. "She's also very positive, energetic and enthusiastic." In fact, her energy is legendary.

"It's like she has a 48-hour day," says human resources director Chris Rosenthal. "I'm still trying to figure out how to do the Holley shuffle."

Quick Link To read a related story about the employee metrics that Jean Holley has set at USG and the criteria behind them, go to www.computerworld.com/q?23452

ew IT Culture

RETURN ON COMMUNICATIONS

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While hundreds of dot-com companies have ceased to be in the past year, they've left a lasting impact on how we pay and reward IT workers.

By Sharon Watson

Return of the DOT-GONERS

NEXT TO GLAMOROUS dot-coms, which offered IT professionals the chance to change the world and become millionaires while wearing bluejeans to work, some corporate IT organizations seemed like mousy country kin, especially as the companies competed for the same limited pool of IT talent.

"The dot-coms gave us a sense of possibility, of the tremendous impact technology can have on a business," says Cynthia Hilliard. As executive director of IT at The Longaberger Co., a Newark, Ohio-based manufacturer of handmade baskets and high-end home accessories, she says, she saw dot-coms lure away several of her employees.

Now, with dot-coms deflated and technology résumés flooding the market, questions are arising about whether corporate IT organizations have learned any lessons from the dot-coms, and what IT professionals and job-seekers can expect from corporate employers.

CIOs and IT human resources consultants say it's still too early to gauge the true, lasting impact of dot-coms on the IT workplace. Even a widespread practice like casual dress codes could be a casualty, with some businesses opting to return to a more button-down look.

But sources do cite two apparent long-term legacies of the dot-com boom: First, IT professionals will still ask for — and receive — high salaries. Second, corporate employers will lure the best IT talent by emphasizing key ways in which their companies differ from dot-coms, and their competitors.

Hilliard suggests one key differentiator: "You still need to offer a product or service people want," she says. "Technology becomes the enabler for that, not the focus."

As the dot-com dust settles, dot-com-style dollars are still in the air. The demand for talent during the dot-com era pushed IT salaries to new heights in the first place. But the decline of those companies doesn't signal the end of highly competitive compensation, say consultants and CIOs.

"Salaries were driven by dot-coms," says Gene Trudell, general manager of computer services at U.S. Steel LLC in Pittsburgh. In his view, he says, the Y2k crisis, an explosion of new technology, and the Internet came together in a "perfect storm" effect, escalating salaries precipitously.

"I'm not sure that was an objective stampede," Trudell notes. Still, he says, he has no plans to reduce salaries and points out that U.S. Steel did make some IT salary adjustments to "get us in line with the IT world."

Further, as his CIO counterparts in the Pittsburgh area were paying signing bonuses of $5,000 to $10,000, Trudell relied on a 17-year-old internship program to insulate his department from an overheated IT talent market. Instead of advertising open positions, Trudell filled them by hiring as many as half of each group of interns to provide experienced talent for U.S. Steel's offices around the country.

Other corporate CIOs are ensuring that their companies are competitive with the new IT salary scale. Longaberger is completing a job analysis survey, comparing its IT salaries to those in the marketplace, even though the company's turnover rate is less than 5% this year, says Hilliard.

Consultants note that while their clients aren't scaling back IT salaries, they will be offering lower raises. But even then, the drop will hardly be cataclysmic. "No one is thinking of double-digit increases, but the percentages aren't dropping to the 4% raises seen by the non-IT population," says Georgine Young, a senior consultant at Lincolnshire, Ill.-based Hewitt Associates LLC.

Further, consultants say many corporate IT organizations have adopted the dot-com practice of project- and performance-based bonuses, sometimes called "variable pay," and are likely to continue this approach.

"Ten years ago, it was very unusual for nonmanagement IT professionals to receive this kind of compensation," says Dave Van De Voort, leader of the

global IT workforce effectiveness group in the Chicago office of William M. Mercer Inc., an international human resources consulting firm. "That's a very positive legacy."

Similarly, Van De Voort and other consultants say making stock options available to IT employees is another permanent dot-com influence. Mercer surveyed 500 IT professionals last fall, and even though many had seen their stocks lose value, most said they wanted stock as part of their compensation.

A New Attitude

All the dollars tossed around to woo IT talent may have forever altered how IT professionals view their jobs — a trend corporate IT needs to anticipate because it could affect retention and productivity, say several consultants.

For example, Van De Voort says he believes the money frenzy has severed the once-strong link between the intrinsic gratification IT professionals get from solving technological puzzles and their job satisfaction.

"We've made traditional IT more coin-operated" in that more IT professionals may now rank money ahead of challenges, Van De Voort says. "That's a real loss."

Job loyalty may also be gone, as IT professionals have grown to appreciate their worth, at least within savvy corporations.

"IT professionals now understand you don't work somewhere forever," says Linda Pittenger, president and CEO of People3 Inc., a Gartner Inc. human resources consultancy in Bridgewater, N.J.

"Conditions are perfect for IT professionals to be free agents," says Bruce Tulgan, author of *Winning the Talent Wars* (W.W. Norton & Co., 2001) and founder of RainmakerThinking Inc. in New Haven, Conn. "They'll just find they're free agents in a more competitive market."

Some consultants say corporations may wind up relying on money to motivate talent because too few corporate IT departments can match the atmosphere of excitement and purpose that drove so many dot-com firms and corporate dot-com initiatives.

However, many CIOs say more than a few IT employees who left for dot-coms wound up missing some aspects of their old jobs.

"They'd call and say they were working like dogs, or that the IPO wasn't going to happen," Hilliard recounts.

"THE DOT-COMS gave us a sense of possibility," says Cynthia Hilliard of Longaberger, pictured outside Longaberger's headquarters building in Newark, Ohio.

DANIEL LEVIN

She notes that Longaberger, a family-owned company, has long offered a casual-dress atmosphere, a wide variety of projects to work on and an emphasis on work/life balance. When dot-com defectors called her to ask for their old jobs back, most said they especially missed that balance, according to Hilliard.

But prodigal IT talent shouldn't count on their former CIOs fattening calves for them. CIOs say they consider rehiring only the very best of these former employees. And no CIO would admit to making any environmental changes based on a former dot-com employee's advice.

In fact, many corporate CIOs say that rather than changing their cultures, the dot-com boom has led them to emphasize their organizations' differences as selling points to potential IT talent. For example, Trudell says U.S. Steel can't permit its IT employees complete scheduling freedom, but he does offer flextime within limits — and he emphasizes that unlike the dot-com world, his IT professionals generally work reasonable, not round-the-clock, hours.

Another "brand benefit" that corporate IT departments could emphasize is the fact that, like many dot-coms, they enable IT professionals to follow career paths that encompass technical and business positions, but in a more stable environment than most dot-coms offered.

For example, Suzanne Yoder is e-business manager at arts-and-crafts company Plaid Enterprises Inc. in Norcross, Ga. She says she came to that position from the company's marketing and branding organization, so she knew that providing product information, project ideas and consumer instructions were vital to effectively selling arts-and-crafts materials. Yoder then learned the technology to ensure that those critical cross-references were mirrored in the database driving the company's Web site.

It's that kind of flexibility that more IT professionals are enjoying today, says Van De Voort. "IT skills are very transportable," he says.

The downside of that is a dilution of what it means to be an IT professional, because so many people can claim that title. The upside, however, is that as IT permeates all aspects of the business world, it becomes a tool for creating new business, thus enhancing the value of IT employees and the role of the CIO, says Van De Voort. ◗

Watson is a freelance writer in Chicago.

Learning to Forgive and Forget

If you're a CIO or IT executive, don't be too sure that the dot-com bust has left you sitting in the catbird seat when it comes to hiring IT talent or retaining existing professionals. The consensus is that talent is still scarce for some key positions and your best IT professionals will always be in demand by someone.

Strategies to Consider:

Keep salaries competitive. "If you try to get cheap with your IT workforce, you'll be talking to me this time next year about your turnover problem," says Dave Van De Voort, leader of the global IT workforce effectiveness group at William M. Mercer.

It's unlikely you'll have the leeway with your IT hiring budget that you may have enjoyed in recent years, say human resources consultants; however, higher IT salaries are here to stay, so expect to pay market rates for proven professionals. Annual bonuses for IT are likely to drop across all industries, though.

Make nice with your hard-to-replace professionals. IT talent with hard-to-find skills can still negotiate on their own terms. According to the "People3 2001 IT Market Compensation Study," released in July, the hot titles in demand are network architect, which takes an average of 4.2 months to fill; database administrator (3.7 months); network engineer (3.6 months); and manager of client technology (3.3 months).

Be selective when you can. With more professionals on the market, for many positions, you don't have to hire the first warm body that comes along. Human resources consultants warn IT departments to check references and ask tough questions to ensure that candidates truly have the skills they're claiming.

Try a new approach. Now is a prime time to test new thinking about how to staff your department. "Get much better at flexible staffing," urges Bruce Tulgan, author of *Winning the Talent Wars* and founder of RainmakerThinking. He recommends taking a page from the dot-coms and hiring teams of independent specialists on an as-needed basis to tackle specific projects, basing pay strictly on performance, such as deadlines met and results delivered.

- Sharon Watson

Ford's Vehicle-Delivery Project Ahead of Plan

Last year, we reported on Ford's plans to enlist UPS Logistics in making new car and truck deliveries speedier and more predictable. Twenty months later, they're ahead of schedule. By Kim S. Nash

FORD MOTOR CO. and UPS Logistics Group Inc. are seeing productivity gains six months sooner than expected from a system designed to make new car and truck delivery faster and more predictable.

Ford has adopted proprietary, Unix-based logistics software from UPS Logistics. It replaces a group of homegrown systems and manual processes that weren't able to give Ford managers a complete status report on its cars and trucks as they are en route to dealerships in the U.S.

In February 2000 [News, Feb. 7, 2000], Ford began work with the United Parcel Service Inc. division in an effort that has already knocked four days out of the typical 14- or 15-day cycle for moving a vehicle from a manufacturing plant to a dealership. By doing so, Ford also has seen the value of its vehicle inventory shrink by $1 billion, which, in turn, is expected to cut annual inventory-carrying costs by $125 million, according to officials at the automaker.

The ultimate goal for the two companies is to decrease delivery time by two more days — for a total of six — and they're almost there.

"We're optimistic in achieving 4% or 5% additional improvement" by the end of the year, says Frank Taylor, Ford's vice president of material, planning and logistics. That could translate into eliminating as much as another day from the process by December.

> We're optimistic in achieving 4% or 5% additional improvement [by the end of the year].
>
> FRANK TAYLOR, VICE PRESIDENT OF MATERIAL, PLANNING AND LOGISTICS, FORD MOTOR CO.

Historically, Ford gave dealerships estimated delivery dates that weren't accurate. Those dates were then passed along to waiting customers. In addition, railroad or trucking delays would further alter the schedule. Ultimately, Ford didn't have a good handle on the status of its vehicles in transit.

"Once you shipped it, you couldn't give a reliable date, plus or minus days, when anyone would see it or where it was," Taylor says. "And now we can."

Stand and Deliver

Pete Greiner, owner of the Greiner Ford dealership in Casper, Wyo., says he began to see better delivery forecasts last summer, about six months into the process.

In the past, Greiner would tell waiting customers that their cars and trucks would arrive within a range of several days. Sometimes that wasn't good enough.

"We've had consumers get so frustrated because [they had] vacations or hunting trips coming up. They'd say, 'If you can't get the truck in time, I'm going elsewhere,' " Greiner says. "Now, we can say to customers, 'We firmly believe your truck will be here Aug. 25,' and, by golly, it shows up."

Most of Ford's legacy systems for tracking vehicle delivery were homegrown point solutions that didn't give the company a unified view of events. In fact, a lot of the information used for tracking vehicles was scribbled down on paper.

FOLLOW-UP

The Ford system tracks cars and trucks by vehicle identification number (VIN). Workers from UPS Logistics and Ford, as well as people at the railroads and trucking companies that haul Ford vehicles, use handheld computers to scan the bar codes for each VIN as the vehicle proceeds from a plant via rail or truck to a dealership.

Executives from both Atlanta-based UPS Logistics and Ford declined to comment on how much the project has cost. One-hundred and twenty people are involved: 93 from UPS Logistics and 27 from Ford.

Aside from technology changes, rearranging the people processes along the distribution chain has also helped improve delivery performance.

For example, Ford has persuaded some of its 6,000 dealerships to extend the hours during which they will receive and unload new vehicles.

Previously, dealers typically accepted vehicles Mondays through Fridays from 9 a.m. to 5 p.m. Now, many dealers will take delivery in the evenings and on weekends.

UPS Logistics helped Ford figure out that having a wider window for delivery meant less of a backlog on Ford's railroad and highway carrier routes. UPS Logistics monitors the traffic at railroad offices and out in the field, says Andy Gonta, vice president of automotive at Canadian National Railway Co. in Montreal.

Before, a shipment of cars and trucks "would hit a facility on a Friday and would sit until Monday, and so would the vehicles that hit on Saturday or Sunday," Gonta explains. "It would take you until Wednesday to get it sorted out."

Next on Ford's agenda: a Web application designed to let dealerships track specific vehicles in transit in real time. The system will allow dealers to extract data from Ford's many different back-end manufacturing systems, combine it with information from rail and truck carriers and funnel it all into a middleware system that will collate it before it's Web-enabled.

Ford said it expects to roll out the application next year; 21 Ford dealers are now testing it.

Ultimately, Taylor says, the system will be "very close" to UPS's own Web-based package-tracking application.

Ford Motor Co. and UPS Logistics Group Inc.

GOALS	STATUS REPORT
1. Cut up to six days from a vehicle-delivery period that's typically two weeks long	**1.** Four days have been cut from vehicle delivery, a milestone reached six months ahead of plan.
2. Make delivery more predictable by knowing more about the location of cars en route from Ford to dealerships	**2.** $1 billion worth of vehicle inventory has been reduced. Ford expects to cut annual inventory-carrying costs by $125 million.
3. Create a Web-based vehicle-tracking application similar to UPS's package-tracking system	**3.** The Web-tracking system, now in pilot testing, is due next year.

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Interoperability Across E-Markets

The death of business-to-business e-commerce has been greatly exaggerated, says Sandy Kemper, who in July was elected chairman of the Global Trading Web Association, the board council for the Global Trading Web (GTW).

Corporate members of the association, such as Cable & Wireless PLC, Citigroup Inc., Commerce One Inc., Deutsche Telekom AG, Mitsubishi Electric Corp. and PricewaterhouseCoopers, have seen their respective e-commerce activities grow 400% to 500% annually, Kemper says.

But to keep the e-ball rolling, participants must now work together to establish interoperability across markets, not just within their own markets, says Kemper, who is also CEO of eScout LLC, a Lees Summit, Mo.-based B2B exchange. Kemper recently discussed these issues with Computerworld's **Gary H. Anthes.**

What are the immediate goals for the GTW? The first is to manifest success in the [individual member] marketplaces. How do we measure that? Transaction volumes, revenues and cost savings. The second goal is to make more robust the interoperations that are across the various marketplaces.

WHO IS HE?

Alexander "Sandy" Kemper, 36, is chairman of the Global Trading Web Association, a group of 44 providers and users of electronic services to 250,000 companies in more than 100 countries.

How are these marketplaces doing now in terms of transactions, revenue and cost savings? Very few [electronic] marketplaces around the world have lived up to their own projections, in part because everyone was too optimistic about how quickly cultural change would take place in the way people were procuring. But clearly, change is taking place. Transactions are up, revenues are up. [GTW] has never announced revenue and transactions as an entity. But you'll soon see an announcement that will be fairly stunning.

What advice would you offer a company that's about to embark on a business-to-business e-commerce initiative? The implementation of e-commerce in any company must be driven by top management. We are talking about significant bottom-line savings, but sometimes those savings come at a cost to the existing structure and to the people in that structure. There's cultural resistance and fear. You can take a lot of menial, manual work out of the purchasing department. But to think that this is something that's going to be quickly adopted in the purchasing department is probably false without strong support from the top.

How can you achieve the interoperability across marketplaces that you are seeking? The technological problems have gone a long way to being solved. What's important now is the business rules. The creation of trust is perhaps the most important mandate we have today inside the GTW, a trust that will enable us to build business relationships that will cause intermarketplace trade.

Does that include security? Security is part of trust. We have to maintain security and privacy, and there has to be economic standards for intermarketplace trade. If I sell this in your marketplace, how will you treat my buyer? And if a buyer from your marketplace is transacting with a supplier in mine, how will I treat that buyer? How will you treat my supplier? And it can't be a closed environment. It's de facto evidence of lack of trust if you don't open up to everyone. Rules for interoperability have more to do now, I believe, with the basics of business and less with the basics of technology.

Still, we hear about battles between electronic data interchange (EDI) and XML. EDI and XML aren't incompatible. You can take EDI and wrap it in an XML wrapper and move it into an XML-based system and be just fine. We want to make possible transactions in EDI, XML, even paper-based transactions — flat-file transactions. We have to make sure we are not putting up any barriers to entry.

Why is the GTW now becoming independent from its creator, Commerce One? [Commerce One] created the GTW operating on [its] platform. Now the GTW has reached enough critical mass to stand on its own, and the GTW recognized it must be open to all marketplace operators, not just those on [that] platform. We have to make sure our interoperability standards are not specific to any particular technology. So that's Ariba, Oracle, SAP — any technology platform.

In speeches, you have consistently been the champion of the little guys, the small and midsize companies. It's not just because I like the little guy. Small and midsized enterprises [represent] 65% of the [U.S.] economy. You can build giant applications for giant corporations and still only get 35% of the economy. So no [GTW] e-procurement or e-commerce plan will be complete without full inclusion of the second-, third- and fourth-tier manufacturers and suppliers in the supply chain.

Is there a danger that won't happen? Yes. . . . But eScout exists because we have [served] those little guys. I have 16,000 or 17,000 buying corporations in our marketplace, and I am seeing increased [spending] and increased transactions. Every week this year, we set a new record. ◗

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How We'll Work

The IT workplace is undergoing change, especially in the wake of the dot-com mania. Not everyone thinks the changes are for the best. By Erik Sherman

When Joe Gallo, vice president and chief technology officer at Cox Interactive Media Inc., goes to work, he heads upstairs to an Atlanta loft with a lounge, ping-pong table, refrigerators with soft drinks and — important when there's a looming deadline — free coffee.

Things have come a long way since Gallo began his career at Electronic Data Systems Corp., at a time when that company had just started allowing employees to wear striped shirts.

"Even a major company like EDS is business casual now, and they're all IT," Gallo says.

Now that corporations have fully embraced technology and the need to compete for skilled technologists, the way in which IT professionals work is undergoing a variety of changes.

Despite the closing of dot-coms in massive scale, those companies have had a dramatic impact on the perks that IT workers are offered, on the access to technology that workers across the board can enjoy and on the environment that companies provide for them. But there is some disagreement emerging on whether the changes are for the better or worse.

IT professionals are often dressed in jeans and focusing on business basics —many times from the comfort of their own homes. But some ask, in the face of high pressure and short deadlines, whether such trends actually threaten to derail future progress or the image of the IT worker.

"The change started to occur with the era of client/server," says Neil Fox, vice president and CIO at Cleveland-based Management Recruiters International Inc. "Then the Internet changed everything. People realized that you could actually create an application and deploy it in less than 12 months."

Many would argue that an increased emphasis on business could only do a world of good. But not all IT professionals see every change hitting the technical workplace as positive. Pressures on businesses have extended to technology groups. Deadlines continue to become shorter as companies want increasing benefits with faster turnaround, and technologists are being held accountable for providing results.

"In the old days, I had a lifetime contract," says Tracy Amabile, a partner in human resources for management consulting at PriceWaterhouseCoopers. "Now, there's a focus on how do I become more employable, not how do I stay employed."

Despite the slowdown in the economy, job hopping has become the norm for IT professionals. Having a number of previous employers on a résumé is no longer something negative, which makes retaining employees more difficult.

"Attracting and retaining and motivating technologists is a survival issue for this millennium," says Allan Woods, vice chairman and chief information officer at Mellon Financial Corp. in Pittsburgh.

"Clearly, you have to pay people — it's the price of admission. But those are openers, jacks or better," Woods says. Increased compensation will come from incentive pay, and not everyone will receive it. Mellon plans to focus on rewarding top employees.

Some workplace trends could even be counter to business ends, like the notion of dispersing IT workers.

"Because IT has enabled people to work anywhere, the big push for companies is to use location to recruit and retain people," says Bob Gaudreau, who is in charge of U.S. development for Regus Management Ltd. in Chertsey, England.

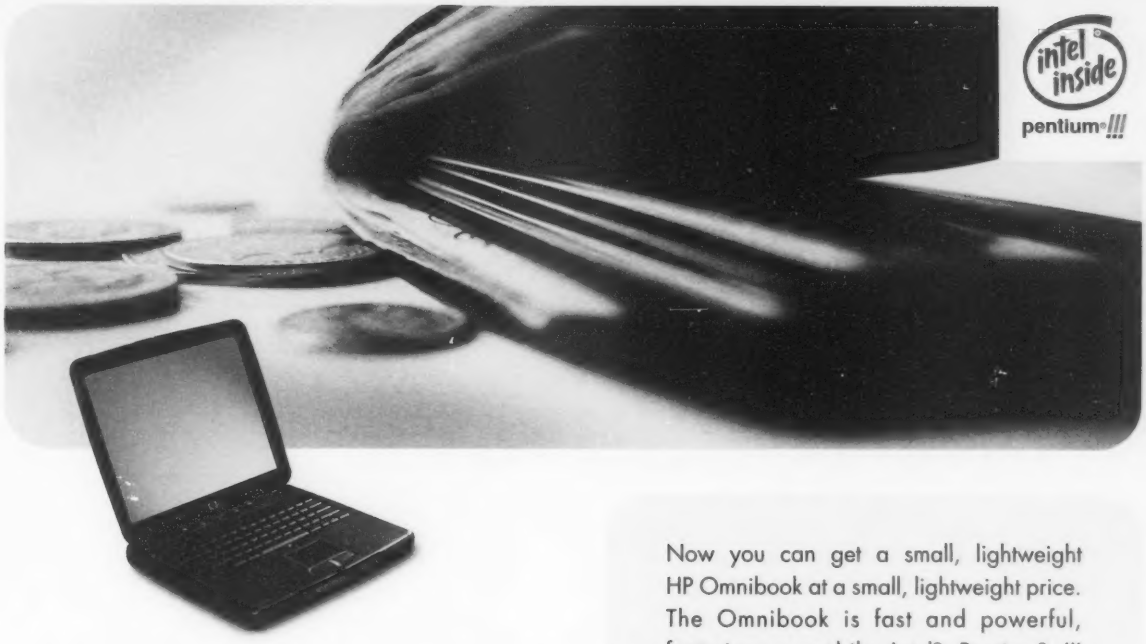
But scattering employees can have some unexpected consequences. "One thing that's gone downhill in an unfortunate way was the demise of the terminal room," says Fisher. "There was a lot of informal information-sharing that is not as intense now that everybody's got their own computer."

Then there are the psychological ramifications, says Edward Klein, who is a professor in the psychology and psychiatry departments at the University of Cincinnati and a faculty member at the Cincinnati Psychoanalytic Institute.

"Social and work connections are needed to maintain a tie between the employee and the organization," says Klein, who emphasizes the need for group action and activity. "Even though you can do a lot of things by teleconferencing or e-mail, I'm talking about the psychological connectedness." The result could add to disloyalty and higher turnover.

So in a way, some of the current trends in IT departments could move people back to an isolated existence similar to early data processing departments. The trick for companies will be to add flexibility in the workplace without severing the connection between technology and business. ◗

Sherman is a freelance writer in Marshfield, Mass.



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Security Ambassadors

As companies increasingly put security in the hands of systems specialists, they need IT liaisons who can translate the needs of business. By Deborah Radcliff

A FEW YEARS AGO, American Family Mutual Insurance Co. ran its IT operations like most other companies do: Business units would hand down an order for a new program or functionality, and IT would build it.

And as in most large organizations, a security manager would attempt to advise developers on vulnerable points and security requirements.

But that approach stretched the lone security manager too thin, says Mike Kleckner, who held that position at American Family three years ago.

So Winnie Schumann, director of enterprise technology strategies at the Madison, Wis.-based company, decided to put security controls into the hands of the systems specialists who knew their technology the best. Then, she handed the choices of individual security controls to the business units that owned the data in question.

All that was needed was someone to decipher the business needs into technical solutions and vice versa. This is where Kleckner and Leslie Peckham come in. They are now the company's information security advisers, coordinating security requirements between IT and business units.

"The business person knows the value of their data, and they know what controls are appropriate, so they should be in the driver's seat," Kleckner says.

Their biggest challenge echoes that of all IT departments: bridging the great divide between technology requirements and business requirements. Bridging this gap takes a certain amount of credibility, which comes from the backing of the most senior IT manager — in this case Schumann, who has also gathered support from the most senior company management.

Once they got this backing, Kleckner and Peckham approached this challenge on two fronts — raising IT awareness in the user community and raising business awareness in their IT support departments.

"How do you describe a [public-key infrastructure] in nontechnical terms and actually get people excited about it? It's a real basic formula: You find out what the business unit wants and give it to them," Peckham explains.

They started by developing a 10-point template from which business units can make informed decisions about their security needs. At the onset of any new project, the security advisers now meet with the business units to discuss their needs and go over the template.

That means asking the right questions, like the following:

- What are your strategic directions?
- What do you deal with?
- What information is confidential?
- What level of protection does that information require?

Once the business unit fills out a project security template, a business partner document is generated. Then the security advisers work with the technologists to address the security areas identified by the business units.

After that, they have to find a way to bring the business mentality of budgets, policies, operational integration and more into IT development teams, Kleckner says.

It's a matter of asking the technology units similar questions, so they can see IT security as a strategic business enabler and overcome their misconceptions that security gets in the way of efficiency, Peckham explains.

The final decision still needs to be made by the data owners. So once the technical specialists turn around a list of suggested solutions to meet the business units' risk requirements, the advisers return to the business units and discuss levels of risk with the business managers who make the final technical security choices that go into the project.

While Kleckner arrived at this position by way of information security, Peckham was an English major then a technology strategist before taking her position at American Family. Peckham says her communication skills and Kleckner's more technical skill set complement each other.

"I'm less technical, so I work on the cultural changes that need to happen in order to enable security to take hold," Peckham says. "I love the awareness training end of the job."

Because their jobs are so creatively and technically demanding, and because security is ongoing, neither Kleckner nor Peckham see themselves moving on anytime soon.

"We see ourselves as being able to change a corporate culture. That is our career progression," says Peckham.

JAMES SCHEPP

Job Watch

Who: Leslie Peckham and Mike Kleckner

Title: Information security advisers

Company: American Family Mutual Insurance Co., Madison, Wis. (*www.amfam.com*)

Report to: Enterprise technology strategies director

Skills: Ability to explain and transfer technology ownership to business units

Security Primer

When undertaking a new development project, American Family enables the business unit project managers to set security requirements themselves. A key element is a template developed by the company's two IT security advisers that explains key terms:

Authentication: Who are you?

Authorization: What can you do?

Confidentiality and reliability: Privacy and dependability

Monitoring and tracking: What did you do?

Backup and recovery: Rebuilding the system

Physical security: Locking others out

Change management: Protecting the production process

Legal requirements: What the law expects

Training and awareness: What you need to know

Contingency planning: What if?

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FRAN QUITTEL

Successful Strategies for Today's CIO Job-Seekers

IF YOU'RE AMONG THE TOP CIOs — say, the upper 5% to 10% — you've probably emerged relatively unscathed from the downturn in the job market. After all, the top-tier CIOs who can deliver millions of dollars of value to multibillion-dollar Fortune 500 companies are always in demand.

Some CIOs are still commanding compensation packages with base salaries as high as $250,000, healthy stock options and bonuses that are 25% to 60% of base pay, according to commentary from IT executive search professionals such as Carl Gilchrist at Spencer Stuart Management Consultants NV in Atlanta; Barry Obrand, area manager at Russell Reynolds Associates Inc. in Palo Alto, Calif.; and Gloria Gordon, vice president of the technology and e-business practice at A.T. Kearney Inc. in Los Angeles.

But if you're a senior, experienced IT professional wondering why your CIO job search is stalled, be warned: There's little spillover of high demand from that elite group to the 90% below.

The number of companies with top-level openings has diminished. More candidates are available, and some are more qualified than others.

"If you're someone who jumped up into a CIO role without the requisite level of seasoning, you're probably finding yourself somewhat disenfranchised in this down market when a lot of good talent is available," says Tom Thomas, president and CEO of Haht Commerce Inc. in Raleigh, N.C.

FRAN QUITTEL is a technical staffing consultant in Emeryville, Calif., and writes the biweekly Career Adviser column for *Computerworld*.

"This is a bare-bones market," reports Paul Lemerise of Rancho Mirage, Calif., who has had senior IT and business responsibilities at True Value and WineShopper.com. "Where once there might have been over a hundred jobs available, now there might be less than 20. Where major projects might have been under way totaling millions of dollars, now capital spending and development projects are implemented on a 'breathe air' basis."

So, if you're a top-level IT manager who is on the market, what can you expect? Where should you look? How should you interview?

And what will you be paid?

First, expect that your job search will take longer than your previous searches, and depend less on geography and more on your selected industry, which traditionally impacts job seekers earning less than $100,000 per year.

"Although Wall Street bonuses are surely not what they used to be, finance — including insurance services and consumer finance companies — energy and health care still remain very strong," says Obrand.

And while jobs in government and education may be harder to identify, these fields are growing technology users, though taking that route might make returning to mainstream commercial IT more difficult.

Second, recruiters are again being flooded with résumés. The best way to get into the loop of current openings is to network your way into the inner-circle CIO fraternity, which is harder to do if you're on the outside looking in.

This is the time when you should call in those chits from helping executive-level recruiters who have called you looking for leads. It's also when you must leverage deep contacts with people who know about the latest projects under way. Pick up the phone and call the people who have worked for you and gone on to other venues.

In addition, CIOs typically report at board meetings. You're definitely at an advantage in interacting with board members who remember your strengths when seeking talent to solve problems among their clients and customers. In short, today's job market is a networking game.

Moreover, once you get your foot in the door and start interviewing with a CEO, there are a few wrinkles you must smooth. You must be able to present yourself as someone who can pinpoint and solve business problems correctly and quickly, whose forecasting capabilities leave no margin for error and whose budgetary sense is flawless.

"If you are being interviewed by a CEO, you want him to think you are a miracle worker," notes Neil Fox, CIO of Management Recruiters International Inc. in Cleveland.

"The magic words are 'I can do more with less,' 'I've taken a good look at the organization, and I believe we either have the right people doing the wrong things or the wrong people doing the right things,' and 'With these steps, we'll be able to achieve this specific goal.' If you can do more with less and get some belief around it, this works," Fox says.

Moreover, you must target the scope of the job you're after to a particular type of firm. If you want to work in a smaller organization, you'll need to wear lots of hats.

Finally, the good news: Even if interviewing and negotiating take longer than you've previously experienced, executive compensation packages hardly ever decrease. While today's bonuses will fall below last year's average of 40%, this year's base salaries have risen 4% to 5%, notes Keith Fortier, a compensation consultant at Salary.-com Inc. in Wellesley, Mass.

And "don't be afraid to load up on low-priced stock options," counsels Fortier. "This is the exact time to cherish getting stock options, grants and all kinds of performance shares, because 18 to 24 months down the road, these options could be worth multiples more."

WORKSTYLES

Solving IT Challenges for A Staff the Size of a City

IT infrastructure: "PMMC has two sets of consolidated data centers that support all five operating companies, and then each company has its own IT staff. I worked in IT at Philip Morris U.S.A. for four years, and I've been here two years."

Mission-critical systems: "In PMMC, an [enterprise resource planning] system for finance and human resources. We're two years into a big ERP initiative to implement common HR processes globally across all of our operating companies.

"The system will give us consistency in how we capture information but will still allow for differences in rules and regulations across locations. I worked on the design for 18 months at Philip Morris U.S.A., and helped re-engineer the HR processes. We just had the first rollout to a small European office [in July], and we'll continue to roll it out over the next few years.

"Now I'm working on Web site development and trying to bring in a content-management approach that will enable people to manage content delivery with very little interference from IS. We've rolled it out here [at PMMC], and we're piloting a few tests to see if it could work as an enterprisewide solution."

What are the differences between working at PMMC and Philip Morris U.S.A.? "Philip Morris U.S.A. is absolutely huge. It had about 40,000 people when I was there, and when you're developing applications, you can have great impact because there are so many users. The first system I worked on there saved about two months per sales cycle because salespeople could use their time more efficiently.

"So you can create some great efficiencies because of the scale, and that's a great feeling. But you're also just one of many, and that can be daunting. It took longer to get things done. Certain aspects of Philip Morris U.S.A. are very efficient, but if you want to turn a very big ship, it can take a little time. Here [at PMMC], when you need to get something done, we're small enough that you can walk across the hall and get it done very quickly."

Philip Morris Management Corp.

Interviewee: Donna Evans, senior project manager

Company: Philip Morris Management Corp. (PMMC), the administrative services arm of Philip Morris Cos.

Main location: New York

Number of IT employees: More than 420 in PMMC

What's the biggest misconception about working at Philip Morris? "Everyone's reactions are different, but for the most part, people don't know what we really stand for. We're more than just a tobacco company. We own the largest food company in North America and the second-largest brewing company in the U.S. So there are times when people ask questions that are negative, but that stems from the fact that they think we are a one-product company."

IT training: "Because we have such a wide range of IT initiatives, there's not one single training event that everyone does. Near and dear to my heart are content-management training and XML training."

IT career paths: "There's not a formal path, but it's common to grow your breadth and depth of technical expertise with different business experience. For example, I've been in two operating companies in six years, and I hope to work in another."

Employee reviews: "We have a formal review yearly, but a part of that is having regular reviews quarterly. Managers are encouraged to talk to their employees throughout the year and keep the lines of communication open. Some managers do reviews as often as every two months."

Bonus programs: "There are merit programs for all employees across the company. There are no IT-specific bonus programs. Raises are not a given, and bonuses are not universal."

Workday: "We start between 8 and 9 [a.m.]; most people are typically in the office 10 hours."

Dress code: "For everyone in New York, it's business. We wear suits, even in IT. The dress code for different locations varies between business-casual and business."

Security badge/card needed to get into building or office? "Yes, to get into the building and on every floor."

Office decor: "We have fantastic art. The company has been supporting the arts for 45 years now, and in the [lobby] of the building, we keep an exhibition space that we partner on with the Whitney Museum of American Art. "

Other on-site amenities: A doctor's office, a fitness center, a hair stylist, a credit union and a company store.

Little perks: "We have lots of informal activities, like celebrating birthdays, marriages, births. And there are lots of employee discount programs — for movie tickets, Broadway shows, amusement parks and Indy car races."

The last word: "In the first 10 to 12 years of my career, I had to jump ship every three to four years to gain the experience I wanted. But it's hard to imagine jumping from here, because it's a great place to work and you get to touch a lot of different technologies."

– Leslie Jaye Goff
lgoff@ix.netcom.com

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UNISYS

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Dear Career Adviser:

I have 12 years of experience in all aspects of security, plus a bachelor of science degree in computer science, an MBA and an MSCE from excellent schools. I have been a chief technology officer twice — once at a small company for four years, and then most recently at a large company for just one year.

My employer has merged with another company, and the merger has redefined the scope of my position.

I'd like to move to another major company in a CTO-level position, with the goal of moving into a CEO role. But instead, I'm getting more offers for my technical skills.

— MAJOR-LEAGUE PLAYER

Dear Major:

Your 12 years of experience are primarily in technical areas, with several short hops at smaller companies, startups and universities. That contrasts with your most recent experience of one year as CTO at a major company.

There is considerable talent available in the current job market — talent that offers both more business experience and more consistent, longer stints at fewer large companies than you do. So it's no wonder you're getting more offers for your technical expertise in security rather than as a leader of an entire business.

You might prefer to skip some steps to reach your goal faster, but the current employment market won't allow you to leapfrog like you could have done in the tighter employment market just a year ago.

According to Tom Thomas, president and CEO of Haht Commerce Inc. in Raleigh, N.C., you're most likely to reach a top slot if you can show logical progression in your career. This includes career stability that involves working your way into consistently larger roles at one company where you also begin to influence the business as a whole.

FRAN QUITTEL is an expert in high-tech careers and recruitment. Send questions to her at **www.computerworld.com/career_adviser.**

You might consider joining a Big 5 consulting company, eventually becoming a practice leader. Then take on a senior management role within a company.

Alternatively, you could consider joining a division of a Fortune 1,000 company in a senior technical role. Then you could work your way up within the one company, perhaps becoming the president of a division before becoming the president/CEO of either that overall company or another organization. Patience and planning are requisite, since this will take time.

Dear Career Adviser:

I am a 12-year software industry technical writer veteran in the Midwest looking for a new home. I am interested in whether companies are still investing in training and whether opportunities in training might be something for me to explore. I have some programming knowledge and expertise in writing product and user documentation.

— TECH WRITER TO TRAINING

Dear Tech Writer:

Training investments are suffering in today's economic downturn. But you can still make the shift if you have instructional design and great presentation skills, plus deep subject-matter expertise.

Areas in which demand for training is strongest include wireless IP infrastructure and data mobility, optical networking and storage-area networks, counsels Eric Goldfarb, CIO of Global Knowledge, a training company in Cary, N.C.

The more knowledgeable you are in terms of pure technology, the faster you'll be at making this switch.

Seek out companies with proprietary technology that have multiple audiences, with each requiring training as a core part of their business, notes Randy Nelson, Dean of Pixar University, at Pixar Animation Studios in Emeryville, Calif.

Look for companies that need to train internal developers, external developers and end users in software, a tool set or a product line, advises Nelson. Finally, stay away from companies that put training far from the true business core. ◗

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Robert Wescott
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BRIEFS

Food for Thought

Perhaps the pressures are getting too great. Maybe the work is piling up too much. Possibly nobody likes them anymore. Whatever the reason, IT managers definitely need to get out more at lunchtime. A new survey by Management Recruiters International Inc. in Cleveland finds that most managers now spend at least one day a week eating lunch at their desks. Nearly one-third said they spend three lonely lunch hours at their desk weekly. And 10% have no lunch life at all, spending every lunch hour at their desks.

Too Much of a Techie?

Not possible, said many CIOs participating in a recent study by Menlo Park, Calif.-based RHI Consulting.

When asked what one skill area they would like to see improved in their IT workers, 34% of the CIOs polled said technical skills, 23% said project management skills, 13% said verbal and written communication skills, and 10% said interpersonal skills.

THIS WEEK

CONTROLLED ACCESS

With privacy a growing concern, IT managers are looking to closely manage access to their largest repositories of information: data warehouses. Good tools are available, but decisions about defining user access to information must come first. **PAGE 44**

CRIMINAL RECORDS

A Linux-based document-imaging system helps the Queens County, N.Y., district attorney keep track of documentation for 50,000 criminal cases per year and makes them easily accessible. **PAGE 46**

HANDS ON

Reviews editor Russell Kay offers a roundup of gadgets that can make life easier and more productive for those who must travel with a computer. **PAGE 48**

EMERGING COMPANIES

RLX's compact blade servers promise to cut power requirements and conserve space in Internet data centers. But the competition could be stiff as Compaq and other industry heavyweights race to catch up with blade servers of their own. **PAGE 51**

NICHOLAS PETRELEY

Let's Get Organized

I HAVE A THEORY ABOUT WHY we aren't recovering from the dot-com implosion as quickly as we ought to be. Perhaps it's just myopia, but I blame at least a portion of our economic woes on the disorganization of information on the Web and the fact that the current state of technology doesn't deal well with this chaos.

There's plenty of information on the Web. Once we pass the threshold where information is truly accessible to the masses, the Internet will become the indispensible foundation of our future economy.

Tim Berners-Lee has attempted to help create the kind of information infrastructure that would support such a future. If you want a glimpse of what he has in mind, read the *Scientific American* article titled "The Semantic Web," by Berners-Lee, James Hendler and Ora Lassila (*www.sciam.com/2001/0501issue/0501berners-lee.html*).

The article begins with a bit of a science fiction story in which people converse with Internet appliances the way the astronauts talked to the HAL 9000 computer in *2001: A Space Odyssey*. Why is it science fiction? We have adequate speech-recognition and synthesis technology. It's just not affordable yet. What we really lack is an intelligent structure for the way we store information on the Web and an intelligent way to interpret and retrieve that information.

If you want to see just how far we are from the goal, try this sort of test on any of a number of Web search engines that accept natural-language queries. I consider the site Ask Jeeves (*www.ask.com*) to be reasonably good, so I asked it, "What is the Semantic Web?" It came up with an excellent list of links.

The question "What are the long-term side effects of phentermine (a weight-loss medication)?" may have produced some starting points, but it didn't give me a link with a direct answer.

But Ask Jeeves failed miserably when I asked questions like "How can I turn on TCP Syn Cookie support in the Linux kernel?" or "What was the name of the ship in the movie *2001: A Space Odyssey*?" Yet these are extremely specific questions containing all the information necessary to find precise answers.

The Semantic Web addresses this very issue. It applies standards like XML and the Resource Description Framework (RDF) to the way we store and categorize information on the Web in order to make it possible to interact intelligently with the Web.

Now don't get me wrong. I'm 100% gung-ho behind XML, RDF or any other acronym that might make Web information more accessible. But all one has to do to sprinkle some reality dust on this fantasy is to browse through a few XML files. What you'll find are the limitations of the standards and of the humans who apply them.

For example, the program Evolution by Ximian Inc. uses an XML configuration file that includes this line: "<entry name="path" type="string" value="2f7573722f62696e2f677067"/>." If you have your secret programmer decoder ring on, you'll know that the string beginning with "2f" is the hexadecimal representation of the ASCII string "/usr/bin/gpg." But if you didn't have a clue, why would you expect a search engine to do any better?

Perhaps that is a poor example, because a well-designed engine should understand that "0" and "False" are the same Boolean value. And it might even discern the difference between text strings and hexadecimal ASCII. But if there is ambiguity among simple data types, how can we expect XML to make it easier to share complex data?

The problem is that the *Extensible* in XML means we get to make up stuff. If we all agreed on what we made up, the metatag keywords in the HTML header on your Web site might actually mean something. But they usually don't. That's mostly due to innocent differences of opinion.

And it can only get worse if some hypothetical monopolistic company exploits the extensibility of XML to make its data more accessible to some software than to others.

So, is there any hope? Enter the RDF, another piece of the Semantic Web. We'll examine RDF in my next column to see if it can do what XML alone can't. In the meantime, assuming your particular Linux kernel supports the feature, you can turn on Syn Cookies with the command "echo 1 > /proc/sys/net/ipv4/tcp_syncookies." And the name of the ship is *Discovery*. Sorry, but I don't know anything about the long-term side effects of phentermine.

NICHOLAS PETRELEY is a computer consultant and author in Hayward, Calif. He can be reached at nicholas@petreley.com.

GUARDING THE DATA WAREHOUSE GATE

With privacy a growing concern, IT managers are looking to closely manage access to their largest repositories of information. By Deborah Radcliff

RISING CONCERNS about privacy mean that the security of sensitive information such as medical and financial data and information about children is coming under tighter scrutiny these days. And this is forcing IT managers to turn their attention to the richest repositories of such data: their data warehouses.

But for many businesses, just defining the roles and purposes of those staffers accessing such data can be daunting. Consider that a single hospital admittance could result in a patient's records being viewed by more than 150 people, both inside and outside the hospital, according to a study by Predictive Systems Inc., a New York-based technology consulting firm.

Fortunately, data warehouse software and the applications that serve such warehouses are relatively mature. Database software can define access down to the object level. And tools to automate user account management are particularly helpful in large user environments.

The first step in data warehouse security is defining what data needs protecting, which can be more difficult than it sounds, according to IT managers.

"[Legislation] talks in general terms about what data needs protecting and provides little of what kind of data and what kind of protection that data needs," says Mike Hager, vice president of network security and disaster recovery at New York-based Oppenheimer Funds Inc., a wholly owned subsidiary of Massachusetts Mutual Insurance Corp. in Springfield, Mass.

The key to passing all forms of regulatory muster is defining "personally identifiable information" and then limiting access to that information to only those with a need to know.

For example, you don't want a statistician mining for demographics on sexually transmitted diseases to also have access to the names and addresses of individual patients with such diseases. Access rights to this type of data must be fine-grained enough that a statistician can only gather broader demographics like age, sex or region.

And that means defining user roles, says Hager. "The real key here is being able to define who has access to what. Without a role-based security model, there is no way of accomplishing this," he says.

It took Hager's team six months to define the roles of Oppenheimer's 2,500 users, 400 of whom require access to the data warehouse.

"There's a business process that must take place before you can automate this," Hager explains. "You need to identify group and individual user rights, which we did by going over [human resources] accounting codes and then going to business units and asking everyone to justify their access needs. And now they must also fill out an annual review form."

Tough Questions

Once you know who requires access to the warehouse, it's time to measure the technical controls around those users. That means asking some tough questions:

- Are access controls fine-grained enough to limit personal-data access to only those who need to know?
- Are access-control lists current?
- How is access to personally identifiable information kept from users who need access to only some of the data in a particular account?

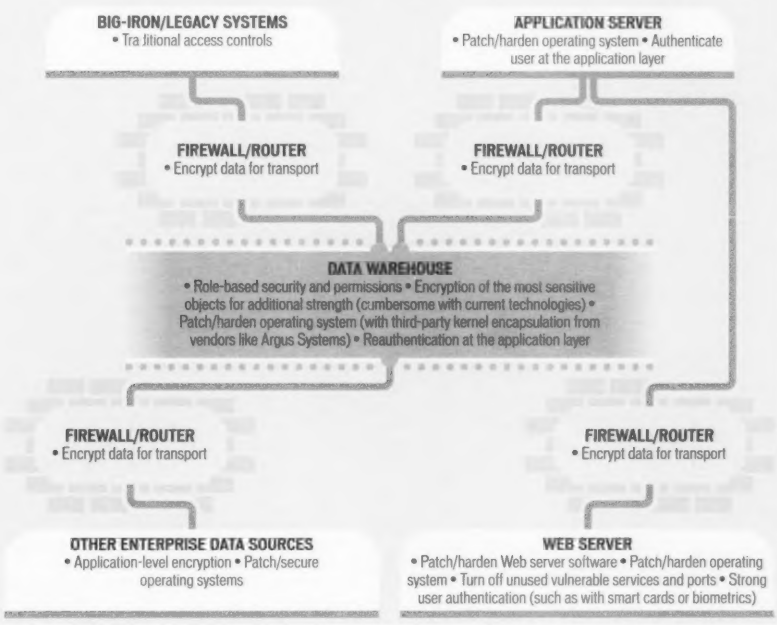
Relying on paper records stating who has access to data makes auditing difficult because there's no one place to see who's accessing what and for what purpose, says Hager. And if you can't figure that out, he adds, how can you ensure that only those with a need to know see just the data they need to do their jobs?

"Say a health care inspector walks into the office and says, 'Show me who needs access to this privacy data, and show me how you restrict it.' Ninety-nine percent of companies won't be able to do this because they only have bits of paper," Hager says. "Administrators just grant the access when it's requested on a piece of paper. And they don't track these permissions."

Hager decided that he needed to automate this process, so he chose a provisioning rights management tool from Access360 in Irvine, Calif. But such tools don't automatically populate themselves, so Hager's team first had to define user roles manually.

But now that user privileges have been populated into the Access360 product, role-based privileges are automatically updated directly from the human re-

Privacy Protection in and Around the Data Warehouse



sources manager's desktop. And if regulators ask for a corporatewide data trail, the tool will produce one on demand.

Currently, Blue Cross/Blue Shield of North Carolina is in the process of determining the roles of every person accessing its data warehouse, says Celia Fuller, director of data warehousing at the Virginia offices of the health insurance provider.

Chapel Hill, N.C.-based Blue Cross/Blue Shield is also planning an update of its two-table access-control format within its warehouse. The first table includes nonencrypted data that's accessible only through role-based access controls built in SQL native to the database itself. These role-based privileges are fine-grained enough to determine who can read, write and delete specific objects in the warehouse, says Fuller.

The second table contains data encrypted with proprietary low-level (30- to 40-bit) encryption, requiring a second-level paper sign-off by management before a higher level of authorization is granted.

Database developers at Blue Cross/Blue Shield are now working out ways to merge all of the data back into a single table and put higher-level encryption on top of the most sensitive data.

Blue Cross/Blue Shield is encrypting a small number of fields, so key management isn't an issue. However, warehouses with large users bases and multiple fields are difficult to encrypt because of key-management problems, say experts.

But encrypting data in the warehouse is important, say IT professionals, because if the database were compromised by disgruntled employees or outside attackers, the data itself would be unreadable.

Some vendors are releasing software with a menu of encryption options and built-in key management that they say should make database encryption easier in the near future. One example is DbEncrypt from New York-based Application Security Inc.

"Database access controls and even low-level encryption are useful, but how do you manage the keys and user passwords to secure those? You can't take a file and encrypt it and put the key next to it. That's just as insecure as using no encryption at all," says Aaron Newman, chief technology officer at Application Security. DbEncrypt stores keys in hash-only algorithms that can't be read or tampered with, he says.

Drawing It Out

The tools that pull data from the warehouse also carry additional features that can protect very fine-grained data sets, something that's particularly important if that data is drawn from the Web by large numbers of users.

For example, Owens & Minor Inc., a Fortune 500 hospital supplies distributor in Glen Allen, Va., has a mature data warehouse called Wisdom in which browser-enabled customers and suppliers can analyze their own purchasing and sales information for potential cost-reduction areas or wasted inventory. Because the application is Web-based, it was imperative that customers and suppliers be prevented from crossing over into one another's data, says Don Stoller, director of information management at Owens & Minor.

Stoller's team engaged security feature sets in its data mining software from San Jose-based Business Objects SA that lock together individual user IDs and their associated access privileges and manages those accounts, along with native, SQL-based privilege statements.

So when users log in to Wisdom, a SQL query checks against a security database that automatically builds a "where" statement to the log-in account and password. The "where" statement is generated each time that account number logs in and only runs the data associated with that account number and password.

As businesses move a greater number of such data mining applications to the Web for their customers or suppliers, securing the surrounding applications and transport layers is just as important as securing the warehouse controls themselves, says technology strategy consultant, Stefan John Silverman, president of SJS Associates NA, an IT development firm in San Francisco.

For example, Silverman oversaw development last year of a new medical diagnostics service available to patients over the Internet. That meant that critical information had to pass from legacy systems to the data warehouse, to a Web server (upon receiving a user-initiated SQL query) and over the Internet.

He decided that the only way to do this was to encrypt everything in transport and on the servers, create a firewall for each transport link, authenticate user IDs and access rights for each application and data set, harden each machine's operating system, and transmit over the Internet using Secure Sockets Layer browser-embedded encryption.

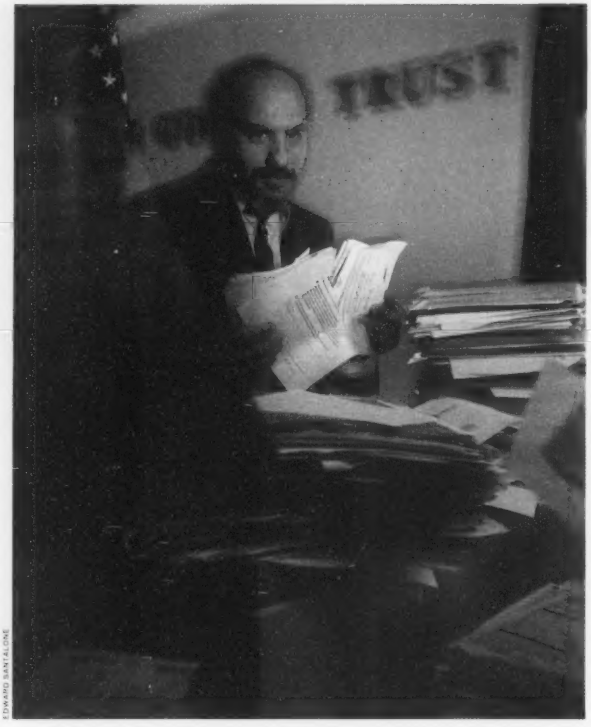
"Anything that's Internet-accessible is scary, especially if it's medical or financial data," Silverman says. "If personally identifiable medical data gets on the Internet, it could impact peoples' lives, their standing in the community, their ability to get insurance or even employment."

KEY AUDIT QUESTIONS

- What type of data is personal and sensitive in nature?
- Where is that data stored?
- Who's looking at the data?
- Which employees in which roles need to see sensitive data to do their jobs?
- Do access controls limit the viewing of sensitive information to only those people with a need to know in order to do their jobs?
- How is data protected from crackers?

THE DA's OFFI
DIGI

> At one time, we had 17 data entry people. Now we have just three.
>
> ROBERT SCHLESINGER, DIRECTOR OF INFORMATION SERVICES, QUEENS COUNTY DISTRICT ATTORNEY'S OFFICE



EDWARD SANTALONE

IN QUEENS COUNTY, N.Y., the district attorney's office was running out of storage space as fast as it was running out of money to rent more. Of the 19,500 cubic feet of case records storage space available to the office, only 775 cubic feet remained. The reasons were many: an increase in the number of prosecutions, an increase in the amount of paperwork associated with the prosecutions and the reduced availability of off-premises storage space in New York City's warehouses.

The finger-in-the-dike answer was to accelerate microfilming of closed case records to gain maximal use of the dwindling space. The office also rented temporary warehouse space at $25,000 per year, using money it would rather have spent putting criminals in jail than papers in a file. Clearly, a less expensive solution was needed. Besides the cash outlay, managing a quarter-century's worth of closed case records stashed at a half-dozen sites was time-consuming and inefficient.

Many of New York City's agencies suffered from the same problem, and they were all scrambling for affordable answers. Working with a $100,000 funding allotment from the state government, the district attorney's office was the first to find one. Together with custom integrator ImageWork Technology Corp. in White Plains, N.Y., the

At the Queens County District Attorney's Office, keeping track of all the documents associated with the 50,000 criminal cases it processes each year is a family affair. There, necessity is the mother of invention, funding is the father, and the prodigal child turns out to be a penguin. By Howard Millman

CE GOES

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office tried a novel approach. It used Linux for something other than running Apache Web servers.

"If we can afford it, we will look at any promising technology to solve problems, even if it's not mainstream," said Richard A. Brown, the district attorney.

(Red) Hat in Hand

Using Windows NT or Windows 2000 for the office's 425 users wasn't something the office could afford.

In seeking alternative solutions, Brown and his technical staff selected Red Hat Linux 6.0 from Red Hat Inc. in Research Triangle Park, N.C., to power a newly acquired Dell Computer Corp. document imaging server. Linux's appeal stemmed from its low acquisition cost, high availability and the tech support staff's prior familiarity with Data General's version of Unix.

From the perspective of the system's users, the choice of Linux was transparent. Clients are Windows 98 machines that use Internet Explorer to view the imaging files stored on the Dell server. The system handles 85 to 100 inquiries per day.

The document-scanning and image-storing programs are custom applications written by ImageWork. The scanning repository, built on top of IBM's DB2 database, communicates with the office's existing case record database from EMC Corp.'s Data General unit via a custom Visual Basic interface. Data General's database and the Linux/DB2 imaging database each run on independent, interconnected servers.

Despite the potential complexity of integrating the Data General database and the DB2 database plus the two custom applications, the project went flawlessly. Almost.

"One of the very few technical problems that arose with the Linux OS and the custom interface stemmed from Linux's tendency to leave an application running even when the application's window is closed. In Windows, closing the window usually shuts down the application," said a much-enlightened Kevin Hansen, ImageWork's president. Until ImageWork discovered and fixed this quirk, users inadvertently launched multiple copies of the Linux database and experienced some odd results.

On Second Thought

Automating manual filing processes provided an opportunity to update workflow channels, and it posed a challenge. Many of the nontechnical problems that the district attorney's tech support staff and ImageWork had to overcome were procedural. For example, they needed to dynamically assemble and collate multiple copies of each case record each time the records changed so prosecutors had access to all the latest data all of the time.

"The greatest challenge was achieving common definitions," says Robert Schlesinger, director of information services at the district attorney's office. He says tracking an average of 50,000 cases per year, each containing five to 100 pages, proves a Herculean task.

"Each of those 50,000 cases usually consists of documents that affect all the defendants arrested on the related offense," he explains. "That case record must keep all records together, even when their cases are eventually disposed of in different venues."

Through planning, testing and retesting, the district attorney's office and ImageWork created a system that can track every document or scanned image that belongs in a case record and relate them to one another.

The district attorney's office keeps case records for 20 years. With the new document imaging system and microfilming, officials hope to gradually reduce the amount of paper by transforming it into high-quality replicas.

Currently, the Linux imaging system holds about 500GB of data. That includes scans and copies of all 1999 case records. The district attorney's office is now entering last year's records. Ed Prchlik, the office's director of system management, predicts that storage will reach 1TB within three years.

Schlesinger says that the office's goal is to increase accuracy and save time by eliminating the need to key in data manually. "At one time, we had 17 data entry people," he says. "Now we have just three. That makes us the leading agency for data sharing." Schlesinger heads up a tech support group consisting of seven staffers and four application developers/designers.

The system doesn't use Linux for security. Instead, when a user signs in, the system validates his rights, and he is allowed to access the Linux image server as well as the case records database. All connections to the image server must first pass through the office's database security system.

What do the users and technical support staff think of the debugged system? "I believe Linux will replace Unix," says Prchlik. "It's full-featured, reliable and fast."

That could be sooner than later, and Schlesinger says that worries him somewhat. Although the hybrid system is operating reliably and all of the bugs are apparently out, Schlesinger isn't ready to relax. At least not until he learns the future of Data General in the aftermath of its 1999 acquisition by Hopkinton, Mass.-based EMC, an enterprise storage provider.

"Our case records system is built on Data General's database and Unix. I hope they stay around for a while," he says. On the other hand, if EMC should stop supporting Data General's legacy products, Schlesinger theorizes that the office's successful adoption of Linux as an application server might just be the first step of a two-step journey.

Claiming that there's "plenty of interest," Schlesinger has fielded inquiries about Linux from other municipal and law enforcement agencies statewide. He says his advice to them is uniformly straightforward: "Build on your tech staff's existing knowledge. Only undertake a project like this if you are already familiar with Unix, and take it one step at a time."

Aside from the pride his tech support staff exudes over the system, how do the office's support staff feel about it?

"To me, this new system is a godsend. I leapt out of my chair when I first heard about it," says public information officer Mary DeBurbon. "I can't tell you how many calls I get each week asking about old cases. From now on, I can keep track of every crime we are investigating." So move over, Batman; Gotham may have just discovered a new symbol of law enforcement, and it's a penguin.

Millman is a writer and consultant in Croton, N.Y.

The Traveler's Kit Bag, Part 1

A fresh look at devices and computer accessories that can make working on the road less onerous and more productive. By Russell Kay

IT'S BEEN A WHILE since I've written about travelers' computing needs, and in that time, a steady stream of new products has appeared. Many of these have become regular travel companions because they solve some problem for me — and they might for you, too.

This week's installment deals with various devices. Part 2, which will appear in a month, will consider how you can pack and carry all this gear. In between, in the Oct. 15 issue, I'll discuss personal backup and data storage for travelers.

KENSINGTON'S FLYLIGHT, a small LED on the end of a bendable-cable arm, provides light for working in dim surroundings.

Mousing Around

I'm a dedicated mouse user. I dislike touchpads of any sort, though I'm much happier with those eraser-head-like pointing-stick devices. But the truth is, I always pack along a mouse. Until recently, that could be just about any old mouse. But now there are some excellent choices especially for travelers.

First is the Optical Mini Mouse (Model No. PAUM003U, priced at $50), from Anaheim, Calif.-based Targus Inc. It's about half the size of a normal mouse but has all of the standard functions, including a scroll wheel. I've carried this several times. Its size, however, can make it somewhat uncomfortable to use for long periods.

But I also like one that's even smaller. The $50 Super Mini Optical Mouse from Tustin, Calif.-based Atek Electronics Inc. is barely half the size of the Targus, meaning it's truly tiny. At this size, you don't really rest your hand on it as you would with a normal mouse; instead, you hold and operate it with your fingers. For some reason, this fits my hand better and is more comfortable to use than the Targus unit. Its size makes it usable on the palm-rest portion of a notebook computer, just below the keyboard. As with all mice, though, it's important to match the device's size and shape to your own hand.

Still, my preference is a full-size mouse. My current favorite is the $69.95 cordless optical MouseMan from Logitech Inc. in Fremont, Calif. And while I'm at it, I always pack along a mouse pad — a very thin rubber pad that takes up very little space. Although it's usually easy enough to get along without a mouse pad, especially with an optical mouse, it can make a real difference.

USB for the Rest of Us

All three of these mice are Universal Serial Bus (USB) devices, and that brings up another necessary item: a USB hub. My 2-year-old Dell Latitude laptop has just a single USB port. Most newer machines have two, and I've seen a couple with three. If I want to use more than one USB peripheral, I need help, in the form of an extension cord for data instead of power (although USB carries power, too). In short, I need a USB hub.

LOGITECH'S MouseMan full-size cordless optical mouse is easier to handle than some smaller models made for travelers.

The first one I ever used cost $300 several years ago. It was a heavy, bulky, metal-cased affair. Now I have two much smaller units, each just half the size of an eyeglass case. These four-port mini USB hubs are from Targus (Model No. PA060U, priced at $49) and Compton, Calif.-based Belkin Components (Model No. F5U007, for $60). One or the other goes with me on every trip.

The Targus is the smaller of the two, but the Belkin offers stackability (and expansion) with other adapters and a choice of colors via slip-on covers. Both work fine, though I found the Belkin's tight-fitting cover harder to use. With either hub, it's important to take along the AC power brick because many USB peripherals, including optical mice, draw more power than the hub can deliver.

And while we're talking about plugging in, Targus has a dandy $120 Universal AC Power Supply that's much lighter than many of those that come with notebooks. Using a series of interchangeable power tips, the single unit can power many different brands and models of notebooks (not all at the same time, of course). It comes with a special AC plug that eliminates the need for one more cord.

Finally, to round out the power story, Targus also makes an auto/airplane universal power adapter for the same price.

New and Neat

One of the niftiest products I've seen in a while is the $20 FlyLight from Kensington Technology Group in San Mateo, Calif. This small LED on the end of a bendable cable arm plugs into a USB port. It gives just enough light so you can easily use the keyboard in dark surroundings — like on a red-eye flight — but it hardly adds to the battery drain.

Kensington claims that the FlyLight saps just 90 seconds' worth of power per hour of battery life. The only comparable device I've ever seen is the little lid-mounted keyboard light that IBM builds into its ThinkPad models. ◗

Quick Link For a checklist of what to take with you, visit our Web site at: www.computerworld.com/q?23255

Transaction Processing

BY PETE LOSHIN

YIN AND YANG, life and death, Clark Kent and Superman. Some concepts are so intertwined that it's impossible to imagine one without the other. Transaction processing (TP) and relational databases [Technology QuickStudy, Jan. 8] make up another such pairing.

In theory, TP can happen without a relational database, but you wouldn't want to try it. And you could do a relational database without TP, but you would lose one of the benefits of having a relational database: the ability to update multiple tables to reflect the completion of a transaction.

Systems capable of doing TP must pass the ACID test: atomicity, consistency, isolation and durability. Transactions are atomic, meaning they either happen or not. If one account is debited, some other account must be credited.

The TP system must always be consistent with its own rules. No transaction can happen if errors are returned as the transaction is processed. For example, if a table that must be updated is on a hard drive that is inaccessible, the transaction fails.

Isolating transactions means that other processes never see database tables in an intermediate state. They may get to see what the database looked like before or after the transaction, but not during. For example, anyone querying an airline reservation system for seating will see all seats not reserved at that moment. But if two people try booking the last seat on tonight's red-eye at the same time, only one can succeed.

Finally, transactions must be durable, meaning that once the last seat is reserved and the customer receives notification of the booking, that transaction is permanently recorded. Even if the system was hit by lightning after the transaction was complete, TP-capable systems would be able to retrieve it.

DEFINITION

Transaction processing is the unambiguous and independent execution of a set of operations on data in a relational database, which treats that set of actions as a single event. If any part of the transaction process fails, the entire transaction fails and all participating resources are rolled back to their previous state.

Phase 1

❶ Global coordinator notifies systems that tables 1, 2, 3 and 4 need to be updated.

❷ Systems check everything, including their storage devices, to make sure they are ready to write data to the tables in question, with both the current and new values accessible but no changes made.

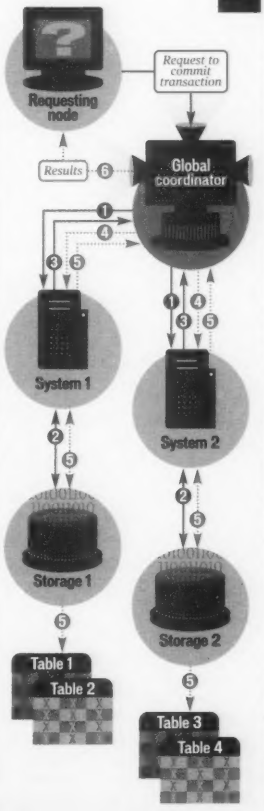
❸ Systems notify global coordinator that they are ready to update tables or not. If any system is not able to make the change, it notifies the coordinator, which notifies all systems that the transaction has failed and the transaction therefore aborts.

Phase 2, if successful

❹ Global coordinator, on receiving affirmation from all participating systems about all tables to be updated, notifies all systems that they can update their tables.

❺ The systems update their tables and report status to the global coordinator (either success or failure).

❻ On receipt of successful completion of the updates to all the tables, the global coordinator can report back to the requesting node that the transaction has been completed.



Two-Phase Commitment

Relational databases are sometimes defined as systems capable of doing transaction processing by virtue of their ACID-support. The "two-phase commit" (2PC) protocol is a defining characteristic as well as a key mechanism by which the transaction is enabled.

In the first phase of the 2PC, a global coordinator notifies all systems in the transaction that they should prepare to either commit the changes required by the transaction or roll back their tables to their previous state. The systems involved notify the global coordinator when they're prepared to commit the transaction or that they won't be able to commit the transaction. If a system doesn't respond, or responds with an error, the global coordinator will abort the transaction and notify systems to roll back the changes.

If all systems are go for the first phase, the coordinator notifies the systems to begin the commit phase by writing all changes and then notifying the coordinator. The transaction is completed only when all systems notify the coordinator that the changes have been committed; if any errors occur at this stage, the transaction will be canceled and all participants are required to roll back changes. (See diagram.)

Transaction processing is a mature technology, as are the relational database and the transaction monitor (see box). All were introduced in the 1960s and 1970s, as large data processing shops required mechanisms for reliably automating transactions. Over the decades, the cost of supporting TP has dropped to the point at which almost any business can apply it profitably.

Today, the problems of distributing transactions on the Web are similar to the problems of distributing them on systems with disparate data tables spanning multiple tape and disk drives. As a result, extending TP capabilities to the Internet is often as easy as building the interface and business logic for an application on an existing system. And e-commerce needs effective TP mechanisms. Without them, there would be no way to verify the transactions that form the basis for e-commerce.

Loshin is a freelance writer in Arlington, Mass.

Transaction Monitors

The global coordinator shouldn't be confused with the transaction monitor, also commonly known as transaction processing monitor software or the transaction server [Technology, QuickStudy, May 17, 1999].

Transaction monitors are middleware programs that mediate between clients and servers. They optimize database performance by acting on behalf of the clients. Rather than have every client open a session with a server, the clients connect to a transaction monitor which queries the server through its own session. This relieves the server from the chore of handling numerous individual sessions.

First introduced in the 1970s for mainframe systems, transaction monitors were reborn in the late 1990s as software publishers rolled out new versions capable of handling online transaction processing systems providing services through Web servers.

– Pete Loshin

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Proper Testing Key to VPN, Web Site Security Efforts

A good security design is not enough; conducting the right tests is a critical last step before launch

BY MATHIAS THURMAN

MY COMPANY'S virtual private network (VPN) project is now almost complete. Last week, I received word that the system engineers had built and configured the Lightweight Directory Access Protocol (LDAP) servers and VPN gateways. That meant it was time to perform final security testing, so I loaded my laptop test machine with vulnerability assessment tools and headed to the data center.

SECURITY MANAGER'S JOURNAL

The laptop test machine is a dual-boot system running Linux and Windows NT. I use the Linux partition to run Nessus, which is a very good (and free) vulnerability assessment tool, and to compile and run exploits that I download from the Internet. We are using Nortel Networks Corp.'s Contivity as our VPN gateway device, and Solaris 2.7 as the LDAP server's operating system, so I downloaded a few Solaris and Nortel exploits from the Internet to test for common vulnerabilities.

That sounds scary, but I felt confident that my limited programming experience is good enough to recognize whether the downloaded source code has any back doors, is malicious or sends data to some third party.

I used the NT partition to run the more sophisticated scanning tools, such as Atlanta-based Internet Security Systems Inc.'s Internet Scanner. The assessments went very well. Later, I plan to incorporate the data into a complete risk document and present it to the project manager.

Upon returning to the office, I had several messages from the program manager responsible for e-business. He was concerned about the security of the new public Web site we're building.

The site is a work of art. It includes load balancers, content servers from Vignette Corp., back-end Microsoft SQL Server database servers and an e-commerce gateway that connects to a payment authorization service over a separate private circuit. The site is fully redundant, from the servers and firewalls to the routers and switches. But will it be secure? The project manager called me in to begin the testing phase.

Fortunately, security has been part of the design right from the start. The project was already moving forward when I came on board, but the project manager sought me out to review the design. I also gave the engineers system-hardening guidelines when they built the servers, so it didn't surprise me when the subsequent vulnerability assessment came back with minimal findings. However, these assessments alone aren't sufficient to give the Web site a clean bill of health.

The problem is that most commercial vulnerability assessment tools only check for specific operating system and third-party program issues. They cover items such as using brute-force methods to crack an authentication mechanism, buffer overflow attempts, and configuration errors in programs such as sendmail, File Transfer Protocol and Berkeley Internet Name Domain. What they don't check for are potential weaknesses in the interoperation between the Web server and other parts of the infrastructure. To fully test the integrity of the new Web site, we need to conduct an application-level vulnerability assessment.

This is a fairly new type of assessment. There are few automated tools that you can use, and you can't just point and click at the Web server to gain the proper insight.

The issues are complex. For example, consider this Web address, which logs user mthurman on to a Web application: *https://someserver.com/cgi-bin/logon/logon?=mthurman/ack/1045623/custom.asp*.

What would happen if a hacker were to replace "mthurman" with "vince.tuesday"? Would the application redirect the attacker back to the original log-on screen to force the proper authentication? Or would the manipulation let the attacker bypass authentication and jump into the account of another user? That's an extremely rudimentary example, but there are scores of possible programming and permission glitches that could allow an intruder to manipulate a Web address to gain unauthorized access.

Since there are many issues surrounding Web-address manipulation, and because this is an area where my knowledge is a bit weak, I decided to outsource our application-level assessment. The problem was, I've had only limited experience in hiring a third party to come in and hack into my infrastructure. So, how does one go about choosing a vendor?

Web Search

I called a few friends and professional acquaintances for referrals, but no one had used a consultant for an application assessment. So I resorted to a Web search. I came up with a short list of three local vendors and then called each in for an interview.

One of my requirements in choosing a vendor was that I had to personally meet the people who would perform the assessment. I wanted to see their backgrounds and certifications. I also requested samples of their vulnerability reports and a list of references. Other than that, there's not too much else on which to judge these organizations.

In the end, I figured that if I felt comfortable with the personalities and qualifications of the individuals, if I liked the format and content of the reports and if reference customers had good things to say about the vendor, that would be enough.

Unfortunately, of the three companies we interviewed, only one provided all of the requested information. But representatives from that firm were extremely knowledgeable and had numerous technical certifications, including the well-respected Certified Information Systems Security Practitioner certification. They passed the nice-guy test.

The reports they sent appeared to be just what the doctor ordered. They contained no boilerplate fluff to take up page space, and no funky graphics or other nonessential materials — just the data needed to identify and mitigate security-related findings. That was hurdle No. 2.

Then I called three of the 10 references. All said they had nothing but exemplary experiences. It helped that I knew one of the references personally. That clinched it.

When it came time for action, the assessment team provided a statement of work, and we agreed upon a time frame. We gave them two user accounts (no data associated with the accounts, of course) and scheduled a commencement date of next week.

Have you been through a Web application security assessment before? Did I leave anything out? If so, I welcome your comments and suggestions in the Security Manager's Journal forum.

LINKS:

www.homeport.org/~adam/review.html and ***www.freebsd.org/security/#spg***: Security managers often need to ensure that program code is reviewed for security deficiencies prior to deployment. Even if you're not a programmer, you can create a code review to address this issue and provide that document and any supporting materials to your quality assurance or engineering department. The links above should help.

www.sanctuminc.com: Of the few application-scanning tools available, my favorite is Santa Clara, Calif.-based Sanctum Inc.'s AppScan. I like the fact that the designers have spent time building actual exploits into the product.

www.dwheeler.com/flawfinder/: Flawfinder is a useful open-source tool for scanning source code. It's available for free, but you'll need Linux to run it.

Quick Link: For more on the Security Manager's Journal, including past journals, visit: www.computerworld.com/q?q2000

■ This week's journal is written by a real security manager, "Mathias Thurman," whose name and employer have been disguised for obvious reasons. Contact him at mthurman@hushmail.com or go to the Security Manager's Journal forum.

RLX Helps Data Centers With Switch to Blades

Its high-density, low-power Web server blades can improve efficiency and cut costs

BY LINDA ROSENCRANCE

When Scott Schedler, chief financial officer at financial Web site The Motley Fool Inc., discovered that RLX Technologies Inc.'s new blade servers cut costs in the company's data center by 60%, he did the happy dance, says chief technology officer Dwight Gibbs.

"We had some issues with our setup," Gibbs says. "The footprint in the data center was too large, and the [system] was [using] a lot of power. So we decided to look at new technology to address our problems."

Gibbs says start-up RLX was the only company shipping server blades when he made his decision. Thus, The Woodlands, Texas-based vendor leapt ahead of industry heavyweights Compaq Computer Corp. and Hewlett-Packard Co., which have announced plans to ship similar products late this year.

On the Leading Edge

A server blade is a complete computing system that integrates processors, memory and I/O functions on a single circuit board. Server blades that fit into the RLX System 324 chassis measure just 4.7 in. high, .58 in. wide and 14.7 in. deep. RLX uses Santa Clara, Calif.-based Transmeta Corp.'s low-power Crusoe microprocessor in its design.

Founded last year, RLX has already garnered $59 million in funding — no mean feat in the current market — and has a seasoned management team that includes Compaq founder Gary Stimac as CEO.

RLX is focusing first on the Web server market, targeting Web hosting companies and Internet data centers, says Michael Swavely, president and chief operating officer. RLX claims to have more than a dozen customers but declines to name them for competitive reasons.

RLX can fit 336 server blades in one rack vs. 42 in a standard configuration. Each blade uses 15 watts of power at peak performance (vs. 75 watts for a traditional server) and delivers five to 10 times more efficiency than other Web servers, says Swavely. RLX's servers generate 80% less heat than standard servers, so they require less air conditioning and backup power, in part because of the Crusoe chip, he claims.

Web hosting firms and Internet data centers, including Internet service providers, application service providers, hosting and co-location companies, content-distribution companies and online businesses, are prime targets for RLX's server-blade technology, according to Swavely.

Cost-Cutters

With the cost of data centers averaging $300 per square foot, firms like New York-based The Motley Fool are trying to figure out how to fit more servers into less space, trim operating costs and increase revenue per square foot while still satisfying the needs of users.

And because of increased energy prices, these businesses are also under pressure to decrease power consumption. As far as The Motley Fool is concerned, RLX's new servers did just that, Gibbs says.

"Using these servers allows us to shrink our footprint [in the data center] and put more CPUs in a smaller space," Gibbs says. "So if we can decrease the square footage and lower power use, we can decrease our costs. And the pricing is also very attractive."

RLX's servers are also easier to maintain than others, according to Gibbs.

"There's not a whole lot of spare parts," he says. "And we need less manpower [to maintain them]. With two [rounds of] layoffs, that was important."

RLX will face competition from larger, more established server vendors by year's end, but the blade-server pioneer says it isn't standing still. "RLX is already planning second-generation solutions," reports RLX spokesman Bob Beach.

Time will tell whether innovation will be enough to keep RLX ahead of the server industry's leaders.

RLX BOASTS $59 million in funding and a management team that includes Compaq veterans Gary Stimac (left) and Mike Swavely.

RLX Technologies Inc.

COMPUTERWORLD emerging companies

25231 Grogan's Mill Road
Suite 600
The Woodlands, Texas
77380-2174
(281) 863-2100

Web: *www.rlxtechnologies.com*

Niche: Ultrathin rack-mounted blade Web servers that conserve power and space

Company officers:
- Gary Stimac, CEO
- Michael Swavely, president and COO
- Mike Perez, vice president of technology
- Christopher Hipp, chief technology officer and co-founder

Milestones:
- November 2000: Company founded
- May 2001: RLX System 324 Web server ships
- September 2001: RLX Control Tower server management software introduced

Employees: 100

Burn money: $59 million from Soros Private Equity Partners LLC, IBM, Ignition Corp., Sternhill Partners, ComVentures and RLX's management team

Products/pricing: An RLX System 324 chassis with six ServerBlades is $6,999; a full chassis with 24 ServerBlades is $26,511, including management software.

Customers: The Motley Fool, plus more than a dozen others

Partners: Transmeta, Microsoft Corp. and Red Hat Inc.

Red flags for IT:
- RLX may lose its early lead once larger competitors ship similar products later this year.
- Its initial products are designed just for Web server functions.

[the buzz
STATE OF THE MARKET]

Leading the Pack

Framingham, Mass.-based IDC expects 2001 to be the year ultrathin server blades gain acceptance in the market. But while other hardware vendors say they're planning to ship such products, RLX was the first to do so, says IDC analyst Mark Melenovsky.

"RLX moved quickly with the RLX System 324 Web server to address the growing demand," says IDC analyst John Humphreys. "With its focus on Web hosting companies and Internet data centers – and the fact that it alleviates the critical density and power issues facing these customers – RLX has positioned itself as a leader in the blade market."

In order to remain a leader, RLX must expand its product beyond Internet data centers and Web hosting companies, says Melenovsky.

According to RLX COO Michael Swavely, the company's goal is to build on its market leadership position in server blades to make inroads into the larger server market.

Although no other company is yet shipping a server-blade product based on a low-power chip, RLX's potential competitors include the following:

Nexcom International Co.

Taipei, Taiwan
www.nexcom.com

Nexcom's HiServer blade servers, which are already shipping, function as Web, firewall, e-mail and video-broadcasting servers. However, they use existing processors from Intel Corp. and Cyrix Corp. rather than low-power chips.

Compaq Computer Corp.

www.compaq.com

Compaq and chip maker Intel are building an ultradense server code-named QuickBlade. The server will use Intel's new Tualatin ultralow-voltage processors and will ship later this year.

Hewlett-Packard Co.

www.hp.com

HP's blade servers are scheduled to ship in the fourth quarter. HP is focusing the design of its blade servers around the CompactPCI architecture and will sell them to telecommunications providers, other service providers and enterprises.

– *Linda Rosencrance*

Systems & Network Consultant

Analyze, plan & specify high-speed data networks on WinNT Server, Novell NetWare Server, Citrix Winframe and Microsoft Terminal Server with Metaframe. Administer multi-user servers connected to thin clients and Wireless Remote Terminals. Perform GroupWare functions with Lotus Notes, Domino Server, Microsoft Exchange & Novell Groupwise. Design, install, administer & monitor local & wide area TCP/IP Networks with Sniffer, LAN Diagnostic Tools, Protocol Analyzers, LAN Probes, LAN Meters, Compass Protocols, RIP2, IPX, SNMP, FDDI, Bay Networks, Routers, Cisco Routers, Hubs, Switches. Use ATM, Frame Relay to develop application evolution for migrating platforms & media for network devices. Install & configure Network Access Servers & SNA gateways under Novell Netware & WinNT & develop switched networks with Multiple Servers, Disk Duplexing, Disk Mirroring, Remote terminals on Eicon SNA LAN Gateway. Eicon ICS Server for Novell Netware. Administer HP Open View Node Manager to manage the Networks. $62,000/yr, 40hrs./wk. B.S. Comp. Sc/App. Comp Engg. Math., Physics, Chemistry or Sc. rel. & 2 yrs. exp. in job offered or rel. field or 2 yrs. related exp. as a Systems Engineer, Network Administrator. Exp. in rel. occupations must include proven ability to perform job duties. BS or foreign equiv. or MS & 3 yrs. exp. in Comp. Science/App. Comp Engg., Math., Physics, Chemistry or Sc. rel. acceptable. May work at unanticipated locations in the US. Submit resume to North Metro, J.O.# 7012247, 2943 N. Druid Hills Rd., Atlanta, GA 30329 or the nearest Dept of Labor Field Service Office.

Systems Analyst (multiple openings), in Englewood CO. Resp. incl. analyzing user requirements, procedures, and problems to improve existing computer applications. Req. Bachelors Degree in Comp. Science or Eng.; 2+ yrs exp. in computer based system development; knowledge of MS-DOS, MS Windows NT/2000, Unix/Linux, C/C++, Visual Basic, Fortran, Java, Java Script, HTML, DHTML, XML, SQL, TCP/IP, HTTP, and SSL. Fax res. 602-438-8493

COMPUTER/IT
Senior Programmer Analyst. (Memphis, Tennessee). Requires a Bachelor's degree or equivalent foreign education in Computer Science or Computer Information Systems and 2 years of experience in the job offered or 2 years of experience in programming and systems analysis for VAX computer systems. All stated experience must have include developing and implementing programs using VAX DCL and FORTRAN on VMS. In lieu of required Bachelor's degree, will accept 2 years of university level credit in any scientific or technical field and 2 additional years of stated experience. Engage in programming and systems analysis for VAX computer systems. Use Virtual Memory System ("VMS") operating system with respect to VAX computer platform. Develop and implement programs using VAX DCL and FORTRAN on VMS. Utilize DECFORMS to create forms within a VAX environment. Write programs using FORTRAN, VAXDCL, and DECFORMS which retrieve and store information onto a codasyl database. 40 hrs./wk. 8:00 a.m. - 5:00 p.m. Salary range: $56,000/yr. to $64,000/yr. depending on qualifications. Send resume to International Paper Company, 4100 Willow Lake Boulevard, Box 24, Memphis, Tennessee

Programmer/Analyst: 4 Positions Job requirements include planning, development, testing & documenting software applications using programming techniques & computer systems; Formulate requirements based on business logic and user input, consult with users to identify current procedures & clarify program objectives; Implement applications by designing and developing websites using tools such as Visual C++, Visual J++, COM/DCOM, SERVLETS, APPLETS, CORBA, MI, EJB, VISUAL AGE, J BUILDER, JDBC, ORACLE, DB2, NETSCAPE ENTERPRISE, WEB SPHERE, DNA SERVER, MERCATOR, ProC, UNIX Scripting. Salary: $60,000/annum. 40hrs/week, in Fort Lauderdale. Required BS Degree in Computer Science or equivalent field with 2 years of work experience.

Programmer/Analyst: 2 Positions Seeking a JD Edwards Expert for the implementation of conversion from Mass90 to JD Edwards One World Xe. Other responsibilities will include software modifications, customization, reports writing, data conversions, providing hands on training and support to the finance staff team. Required skills include JD Edwards, and MS Windows 2000. JD Edwards One World Xe certification is preferred. Salary: $60,000/annum. 40hrs/week, in Fort Lauderdale. Required BS Degree in Science or Accounting/Finance. Must also have 3 plus years experience in Implementing Financial Systems.

Mail/Fax your resume to:
A.J. Solutions, Inc.
5100 NW 33rd Ave., Suite 249
Ft. Lauderdale, FL 33309
Fax: 954-730-7907

PROGRAMMER ANALYSTS required for our Arlington Heights office. Design, develop and maintain new and existing software applications using Developer 2000, Designer 2000, Visual Basic, Oracle, Cobol, C++, Erwin and object oriented design Develop and implement client/server applications in oracle financials and using synchronization techniques in Oracle tools such as PL/SQL, Developer 2000 and designer 2000; write source codes based on design specifications, research feasibility of new products/features and add new features as requested by clients; perform unit, system and integration testing before release and correct bugs; Develop relational database system in oracle, Visual Basic and Windows, Unix environment. Bachelors Degree required in Math, Computers, Engineering or any other related field of study plus two (2) yrs of experience in the job described above. 40 hrs/wk. Must have proof of legal authority to work permanently in the U.S. Please send resume and cover letter to HR Manager, Terasoft International, Inc., 2015. S. Arlington Heights Road, #114, Arlington Heights, IL60005.

DIRECTOR, INFORMATION TECHNOLOGY OPERATIONS

TrizecHahn Office Properties, Inc., seeks a Director, Information Technology Operations, who will develop, organize, plan, and support all functions of IT Operations, including telecommunications and system design, programming, installation, operation, hiring, and system maintenance.

Requirements: The candidate must possess a related Bachelor's Degree and six years of related experience, including accounting financial systems conversion, Virtual Private Network development and mobile workforce support, and recruitment of systems managers and team development.

Please fax resumes to M. Phelan (312) 466-9772.

Banking

MBNA Hallmark Information Services, a subsidiary of MBNA, the world's largest independent credit card issuer, is accepting applications for several **Lead Datsbase Engineering** positions.

Duties: Direct a project team by providing technical expertise and leadership. Ensure that related database projects comply with overall division strategies and goals while consistently prioritizing the workflow. Prepare, execute, and evaluate project plans, proposals, and timelines. Conduct long-range planning sessions to identify new database products to enhance the environment.

Requirements: At least five (5) years of progressive experience in database development and maintenance and a four-year college degree or equivalent technical education. Experience with Unix and NT operating systems and database and/or application development software. Minimum of four years experience with Sybase, Informix, Oracle, or a related relational database.

Please forward your resume and a cover letter, referencing source code YNA991267A, to Ms. Sharon Alexander, MBNA Hallmark Information Services, 1100 North King Street, Wilmington, DE 19884-2234. We are a voluntary Equal Opportunity/Affirmative Action Employer, M/F/D/V.

JUNIOR PROGRAMMER/ANALYST to analyze, design, develop, implement, and maintain web-based e-commerce application software in a client/server environment using Object Oriented technologies, C++, Java, CORBA, Orbix, Oracle, and TCP/IP under SUN Solaris, UNIX, Linux, and Windows NT/2000 operating systems; Perform duties under close supervision of project director to ensure accuracy and that project progresses according to prescribed instructions and expected results are met. Require: B.S. degree in Computer Science, an Engineering discipline, or a closely related field with one year of experience in the job offered. Extensive travel on assignment to various client sites within the U.S. is required. Competitive salary offered. Apply by resume to: Vishy Dasari, President, Objectnet Technologies, Inc., 1117 Perimeter Center West, #N402, Atlanta, GA 30338; Attn: Job SK.

Applications Database Administrator: Analyze, design, develop and test software programs, stored procedures and reports for financial business solutions using MF COBOL, embedded SQL, C and PL/SQL, Monitor processes using UNIX scripting and scheduling. Conduct application version management and distribution management of multiple databases including optimization of database performance, maintenance of database security and integrity. Sal:$53,000/yr.(overtime exempt), 37.5 hrs/wk., 8:30 am - 4:45 pm Mon-Fri. Requirements: Bachelor's degree in Computer Science or Mathematics and 1 year exp. in job offered or as a Programmer Analyst. 1 year exp. must include use of C, PL/SQL and MF COBOL. Location: Chicago, IL Loop. Applicants must show proof of legal authority to work in the U.S. To apply send 2 copies of both resume and cover letter to: Illinois Dept. of Employment Security, 401 S. State St., 7 North, Chicago, IL 60605. Attn: Lydia Clarke, Reference #V-IL 28522-E. An employer paid ad.

COMPUTER/IT
SAP Developer (Memphis, Tennessee). Requires a Bachelor's degree (or higher) or equivalent foreign education in Computer Science, Engineering, Business Administration, or Management Information Systems, and 2 years' experience in the job offered or 2 years' experience in ABAP/4 programming in Human Resources module including payroll clusters and benefits administration using Screen-Painter. Experience must have included 1 year's work with each of the following: WORKPLACE including ESS and ITS; and SMARTFORMS. Engage in ABAP/4 programming in Human Resources module including payroll clusters and benefits administration using Screen-Painter and SMARTFORMS. Engage in programming in WORKPLACE including employee self-service (ESS) and internet transaction server (ITS). Tune reports using ABAP performance tuning techniques and code reviews and maximize efficiency of SAP Oracle database environment. Troubleshoot problems in SAP human resources, payroll, and workplace processes. 40 hrs./wk/ 8:00-5:00. Salary range: $70,000/yr. to $78,000/yr. depending on qualifications. Apply with resume to: International Paper Company, 4100 Willow Lake Boulevard, Box 24, Memphis, Tennessee 38118.

Multiple openings for IT professionals with industry exp. (various skills combination reqd.) in VC++, SQR, HP-Unix, Pro*C, HP-9000, Oracle 7.x, DRS 6000/Unix SVR4.2 etc. Some positions require MS or equiv. CS, Comp. Engg., Bus. Admin. or rel. field. Others require BS or equiv. as above. Pay matching exp. Foreign educ. equiv &/or combination of educ/exp. accepted. Travel/relocation reqd. Resume & salary expectations to Data Dynamics, Inc., 4195 Regency Park Ct., Atlanta, GA 30341.

SOFTWARE ENGINEER

Software engineer to design, develop and test computer programs for business applications; analyze software requirements to determine feasibility of design; direct software system testing procedures using expertise in Java, Oracle and JavaScript. Requirements: Bachelor's Degree or equivalent in Computer Science or related field and two years experience as a software engineer or computer programmer, knowledge of Java, Oracle and JavaScript. Salary: $66,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: Manager, Westmoreland County CareerLink, 300 East Hillis Street, Youngwood, PA 15697-1806. Job No. WEB199678.

QA Manager
Houghton Mifflin Company is seeking a Manager, Information Technology Quality Assurance, for our Boston, Massachusetts office, who will be responsible for providing quality assurance for Houghton Mifflin Company IT systems. The incumbent will research, design, and develop a quality assurance process to support Houghton Mifflin Company information and technologies. Send resumes to: Nicole Sherman, Houghton Mifflin Company, 222 Berkeley Street, Boston, MA 02116; Fax: (617) 351-1106 or email: Nicole_Sherman@hmco.com. Houghton Mifflin Company has a strong and proud commitment to diversity.

PROGRAMMER/ANALYST to analyze, design, develop, implement, and maintain web-based application software in a client/server environment using Object Oriented techniques, ASP, VB Script, Java Script, HTML, Visual Interdev, VisualBasic, SQL Server, Oracle, and Crystal Reports under Windows 95/98/NT/2000 operating systems. Require: Bachelor's degree in Computer Science/Engineering, Business Administration, or a closely related field with two of years experience in the job offered or as Programmer. Extensive travel on assignment to various client sites within the U.S. is required. Competitive salary offered. Apply by resume to: Vishy Dasari, President, Objectnet Technologies, Inc., 1117 Perimeter Center West, #N402, Atlanta, GA 30338; Job VR.

SOFTWARE ENGINEER

Software engineer to design, develop and test computer programs for business applications; analyze software requirements to determine feasibility of design; direct software system testing procedures using expertise in C++, Sybase and JSP. Requirements: Bachelor's Degree or equivalent in Computer Science or related field and two years experience as a software engineer or computer programmer, knowledge of C++, Sybase and JSP. Salary: $66,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: Manager, Indiana Job Center, 350 North Fourth Street, Indiana, PA 15701-2000, Job No. WEB199691.

COMPUTER/IT
Development Manager (White Plains, New York)- Requires Bachelor's degree (or equiv. foreign educ.) in Computer Science, Computer Eng., or Electronics Eng. & 4 years of exp. in the job offered or 4 years of exp. developing information mgmt. systems for investment mgmt. & brokerage operations. Exp. must include 2 years exp. in each of the following: use of Nomad on VM/CMS operating system; Delphi 2.0; ADP's BPS & PSR systems; & Bottomline's Paybase system. (Exp. may, but need not be, concurrent.) Manage team of developers & database administrators to develop, implement, & maintain cash mgmt., trade processing, & operations mgmt. computer systems. 40 hrs./wk. 8:30 a.m. - 5:30 p.m. Apply with resume to: Alliance Capital Management L.P., Attn: Karen Mooney, 1345 Avenue of the Americas, 46th Floor, New York, New York 10105.

Systems Analyst Duties: Analyze, design, develop & implement business requirements for computer system database for credit card consumer lending ind. using CapStone software. Perform data mapping & database tables using Oracle. Perform online system testing using CapStone. Perform maint. & provide support for system. Requires: B.S. (or foreign equiv.) in Comp. or Info. Sci., Bus. Admin., Eng. or related field & 2 yrs exp. in the job offered or 2 yrs. exp. as a Consultant. Concurrent exp. must incl. 2 yrs. exp. analyzing business requirements for computer systems & 2 yrs. exp. using Oracle. EOE. 40 hrs./wk; 8:00 a.m. to 5:00 p.m. Send resume (no calls) to: Amy Quinn, CTG, Inc., 9432 Baymeadows Rd., Suite 240, Jacksonville, FL 32256-7988.

PeopleSoft Senior Consultant. Job location: Chicago, IL. Duties: Analyze, design, develop & implement software solutions for PeopleSoft HR modules using SQR, PeopleCode & SQL. Perform application design, set-up & testing using PeopleSoft, Visual Basic & Oracle database. Perform troubleshooting of system & provide post-prod support. Requires: M.S. in Comp. or Info Sci., Eng., or related field & 1 yr. exp. in the job offered or 1 yr. exp. as a Consultant, Software Eng. or Developer. Concurrent exp. must incl. 1 yr. exp. designing, developing & implementing PeopleSoft modules & 1 yr. exp. using PeopleSoft. EOE. 40 hrs./wk.; 8:00 a.m. to 5:00 p.m. Send resume (no calls) to: Diane Tuccito, AnswerThink, Inc., 817 W. Peachtree St., Ste. 800, Atlanta, GA 30308. Must have legal auth. to work in U.S.

COMPUTER/IT Programmer Analyst (White Plains, New York)- Requires Bachelor's degree (or equiv. foreign educ.) in Mathematics, Computer Eng., or Computer Science & 3 years of exp. in the job offered or 3 years of exp. as a systems developer, systems programmer analyst, or programmer analyst. Exp. must include 6 months in the financial services industry in any capacity; & 6 months using Delphi 2.0, Visual Basic, & SQL. (Exp. may, but need not be, concurrent.) 40 hrs./wk. 8:30 a.m. - 5:30 p.m. Apply with resume to: Alliance Capital Management L.P., Attn: Karen Mooney, 1345 Avenue of the Americas, 46th Floor, New York, New York 10105.

SOFTWARE ENGINEER Software engineer to design, develop and test computer programs for business applications; analyze software requirements to determine feasibility of design; direct software system testing procedures using expertise in JavaScript, DB2, PL/SQL. Requirements: Bachelor's Degree or equivalent in Computer Science or related field and two years experience as a software engineer or computer programmer, knowledge of JavaScript, DB2, PL/SQL. Salary: $66,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: Manager, Indiana Job Center, 350 North Fourth Street, Indiana, PA 15701-2000. Job No. WEB200307.

SENIOR SOFTWARE ENGINEER to lead a team in the design, development, testing, and maintenance of application software using Java, C, C++, Oracle, VisualBasic, CORBA and DB2/400 under Windows NT and UNIX operating systems. Supervise and mentor junior programmers and engineers. Require: B.S. degree in Computer Science, an Engineering discipline, or a closely related field with five years of progressively responsible experience in the job offered or in the related occupation of Programming/Analyst or Programmer. Extensive travel on assignments to various client sites within the U.S. is required. Competitive salary offered. Apply by resume to: Rajender Gaddam, Director of HR, Orgone Enterprises, LLC, 1004 Crooked Creek Court, Mableton, GA 30126; Attn: Job EC.

SOFTWARE ENGINEER Software engineer to design, develop and test computer programs for business applications; analyze software requirements to determine feasibility of design; direct software system testing procedures using expertise in C++, Swing, Java and SQL Server. Requirements: Bachelor's Degree or equivalent in Computer Science or related field and two years experience as a software engineer or computer programmer, knowledge of C++, Swing, Java and SQL Server. Salary: $66,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: JS Supervisor, Greene County Team PA CareerLink, 4 West High Street, Waynesburg, PA 15370-1324, Job No. WEB199681.

SPL WorldGroup is an international builder of customer information systems for utility companies. We are currently looking for individuals with DB2, Natural/Adabas, Smalltalk, Java, Cobol, and Javascript skills to work in our development centers in California, New Jersey and Illinois as:

Programmer Analysts
Database Administrators
Software Engineers
Project Leaders
Designers
Architects
System Analysts

SPL WorldGroup, Inc.
75 Hawthorne Plaza, Suite 2000
San Francisco, CA 94105
Attn: Jennifer Bowman
Fax: 415-541-0224
E-mail:
jennifer_bowman@splwg.com

SENIOR DATABASE ANALYST to analyze, design, develop, implement, support, customize and administer Oracle database systems and applications, focusing on HR, GL, PO and AP modules, using Oracle Financials, Forms, Reports, PL/SQL, Pro-Cobol and Designer2000 under UNIX, Windows and VAX operating systems. Require: Bachelor's degree in Computer Science/Engineering, Business Administration, or a closely related field, with 5 years of progressively responsible experience in the job offered or as a Systems Analyst. Extensive travel on assignment to various client sites within the U.S. is required. Competitive salary offered. Apply by resume to: Diane McHugh, Business Manager, BOSS Corp., 6455 E. Johns Crossing, Suite 404, Duluth, GA 30097; Attn: Job VN.

SOFTWARE ENGINEER Software engineer to design, develop and test computer programs for business applications; analyze software requirements to determine feasibility of design; direct software system testing procedures using expertise in Java, Oracle, JavaScript and WebLogic. Requirements: Bachelor's Degree or equivalent in Computer Science or related field and two years experience as a software engineer or computer programmer, knowledge of Java, Oracle, JavaScript and WebLogic. Salary: $66,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: Fayette County Team PA CareerLink, Attn: JS Supervisor, 32 Iowa Street, Uniontown, PA 15401-3513, Job No. WEB199668.

Software AG, Inc. is recruiting for all types of Systems Analysis Consultants, Staff Consultants, Project Managers/Leaders, System/Software Engineers, Quality Assurance and R&D Specialists, Programmer/Analysts and other computer science professionals.

We have offices throughout the U.S. including: Reston, VA; Atlanta; Chicago; Dallas; Sacramento, San Ramon and Irvine, CA; and Denver.

Resume to: Software AG, Inc., ATTN: HR, Computerworld Ad, 11190 Sunrise Valley Dr., Reston, VA 20191. Fax: 703-391-8340. For additional information, find us under Computer, or visit our Web site: www.softwareagusa.com.

SOFTWARE ENGINEER Software engineer to design, develop and test computer programs for business applications; analyze software requirements to determine feasibility of design; direct software system testing procedures using expertise in Oracle, C++ and TCP/IP. Requirements: Bachelor's Degree or equivalent in Computer Science or related field and two years experience as a software engineer or computer programmer, knowledge of Oracle, C++ and TCP/IP. Salary: $80,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: Manager, Beaver County Team PA CareerLink, 2103 Ninth Ave, Beaver Falls, PA 15010-3957; Job No. WEB199673.

PROGRAMMER/ANALYST to analyze, design, develop, implement, and maintain web-based application software in a client/server environment using Object-Oriented technologies, ActiveX, COM/DCOM, Visual Interdev, ASP, HTML/DHTML, Oracle, SQL Server, and XML under Windows NT/2000 operating systems. Require: Bachelor's degree in Computer Science/Engineering, Business Administration, or a closely related field with two years of experience in the job offered or as a Programmer. Extensive travel on assignment to various client sites within the U.S. is required. Competitive salary offered. Apply by resume to: Vishy Dasari, President, Objectnet Technologies, Inc., 1117 Perimeter Center West, #N402, Atlanta, GA 30338; Attn: Job VK.

Senior Data Warehouse Developer
Use COBOL, SQL, DB2, and data modeling tools to analyze, design, and develop corporate data warehousing programs. Develops and designs data extraction, cleaning, modification, movement and storage programs and supports client area business intelligence tool use. Job requires experience with computer hardware, software languages and operating systems, computer programming skills, coding, programming/processing logic of corporate-based computer systems; experience with computer database environment and multiple database management systems (i.e. DB2, SQL, Oracle, Nucleus, etc.) Requirements: Bachelor's Degree in Computer Science or related field plus three (3) years experience. $62,500/year. M-F, 8 hours/day. Mail resume to Physicians Mutual Insurance Company, c/o Human Resources, 2600 Dodge Street, Omaha, NE 68131.

PROGRESS SOFTWARE CORP. is seeking a qualified software professional to fill the following position: Manager Customer Tech Services – Latin America Responsible to manage communications with subsidiaries and distributorships located throughout Latin America. Act as a liaison between the customers in Latin America and company product planning processes in US. Monitor technical support issues managing the resolution of complex technical issues. Develop special technical training programs for technology products including PROGRESS 4GL, Java, HTML, Actuate and CorVu Software. Train staff in sales/support throughout Latin America. Bachelor degree CS/Engineering/Math or related and two years of experience in the job offered or as a Tech Accts Mgr/Tech Suppor/in Latin America. Position based in Boca Raton, FL. Fluency in Spanish. Contact: C. Ward, Progress Software, 14 Oak Park, Bedford, MA 01730 or FAX resume to 781 280-4035.

Software Engineers and Developers Needed

Design and develop ENOVIA'S Application Software. ENOVIA is a leader in developing and implementing innovative Digital Enterprise Solutions. ENOVIA'S Cutting Edge solutions include WEB based Digital applications designed to help manufacturers create, manage, communicate and digitally simulate all aspects of the product life cycle.

Requirements for various level positions include degrees in Computer Science, Engineering, or a closely related field. Experience preferred in Java/C++, SQL, Windows NT and Unix.

ENOVIA offers a competitive salary and comprehensive benefits package. ENOVIA is an equal opportunity employer. Qualified applicants please forward your resume and salary requirements to: enoviahr@enovia.com

Software Engineer wanted by a Telecommunications co. in Boston, MA. Must have a Master's degree in Comp. Sci. or related field & 3 yrs. exp. as a Software Engineer/Software Developer plus exp. with the following: programming in C++, GUI, and Windows platform SDK, COM, XML, ActiveX, OOA, OOD and multithreading. In lieu of a Master's degree, we will accept equivalent combination of education and experience. Please respond to Net2Phone, Inc., 200 High Street, 3 Fl., Boston, MA 02110. Attn: Matt Eichner reference #2.

Banking

MBNA Hallmark Information Services, a subsidiary of MBNA, the world's largest independent credit card issuer, is accepting applications for several **Senior Technology Analyst** positions.

Duties: Develop and enhance new applications. Maintain up-to-date awareness of current and future direction of internal division and business unit strategy. Identify areas for improvement in the production environment and work with management to implement these improvements. Act as project lead to assist staff in the development lifecycle and mentor other developers in the development methodology. Assist management and business area staff to define and validate application requirements. Create and maintain appropriate support documentation and review other developers' documentation.

Requirements: Four-year college degree or equivalent required. Minimum of 3 years of related experience in maintenance and development of software applications; experience with Microsoft C++, Visual Basic, PowerBuilder, or related development applications and tools; and experience with Unix and NT operating systems and application development software.

Please forward your resume and a cover letter, referencing source code YNA991267, to Ms. Sharon Alexander, MBNA Hallmark Information Services, 1100 N. King Street, Wilmington, DE 19884-2234. We are a voluntary Equal Opportunity/Affirmative Action employer, M/F/D/V.

Web Solutions Lead Program Integrator - Milwaukee, Wisconsin Develops, leads, and implements internet, intranet, and extranet solutions across eBusiness programs globally for global manufacturer of medical diagnostic imaging systems. Leads the assessment, design, and technical execution of cross-functional programs to achieve tangible business results. Integrates and leads web solution resources aligned with functional teams. Coordinates consulting and technical resources on and offshore. Drives technical program execution and operating mechanisms to achieve a high level of quality and execution mapped to critical business objectives. Required is a Bachelor of Science degree in Computer Science or Computer Engineering. Five (5) years of progressive post-baccalaureate experience as a Programmer, Programmer Analyst or Web Developer. As part of the required experience, the applicant must have: had experience in integrating web-based applications; had experience with HTML, XML and UNIX; and had f experience with middleware integration technologies. Must have proof of legal authority to work permanently in the United States. Please submit resume and cover letter to opportunities@ge.careers.com and reference this job code in subject line of email: GEMS/260152/AN030. An Equal Opportunity Employer.

SOFTWARE ENGINEER (Atlanta, GA) to design, develop, analyze, support, test and modify local, network and internet related software applications. Require: Bachelor's degree (or foreign equiv.) in Computer Science, Electrical/Mechanical Engineering, or a closely related field, with a demonstrated ability to perform the stated duties gained through previous work experience or academic coursework and projects. Hours: 8 am to 5 pm, M-F. Send resume to: KM-HR, CheckFree Services Corporation, 6000 Perimeter Drive, Dublin, OH 43017; or e-mail to itcareers@checkfree.com ATTN: Job PK

Senior Software Engineer - Milwaukee, Wisconsin
Participates on a software platform team to design the next generation of medical equipment software architecture using leading edge software technologies, including Java, CORBA and Linux. Defines generic, reusable and distributed components to provide a common software platform to be reused across the modality of the segment product lines and in a global team of engineers. Works closely with the system team to generate software requirements for the platform, to maximize the synergy of the platform across product lines and to ensure the scalability of new software components. Leverages Six Sigma methodology to improve the quality and the robustness of the platform continuously. Required is a Bachelor of Science degree in Electrical or Electronic Engineering, or in Computer Science. Two (2) years of experience as a Software Developer, Design Engineer, or Systems Specialist. As part of the experience being required, the applicant must have: had experience in requirements gathering, designing and developing software utilizing various programming languages, including C/C++ and Java; working with operating systems, including VxWorks; working with NT and Unix platforms; working with object oriented design methodology; and working with ClearCase. Must have proof of legal authority to work permanently in the United States. Please submit resume and cover letter to opportunities@ge.careers.com and reference this job code in subject line of email: GEMS/260151/AN030. An Equal Opportunity Employer.

Banking

MBNA Hallmark Information Services, a subsidiary of MBNA, the world's largest independent credit card issuer, is accepting applications for several **software engineering** positions.

Duties: Develop and code new applications. Maintain legacy applications. Resolve problems with production applications and monitor application performance. Analyze and evaluate business requirements and assist with project planning and walkthroughs. Create and maintain appropriate support documentation and ensure strict adherence to Corporate and departmental polices and procedures.

Requirements: Four-year college degree or equivalent. Minimum of 2 years of related experience in maintenance and development of software applications; experience with Microsoft C++, Visual Basic, PowerBuilder, or related development applications and tools; and experience with Unix and NT operating systems and application development software.

Please forward your resume and a cover letter, referencing source code YNA991267B, to Ms. Sharon Alexander, MBNA Hallmark Information Services, 1100 N. King Street, Wilmington, DE 19884-2234. We are a voluntary Equal Opportunity/Affirmative Action employer, M/F/D/V.

Symphony Corporation, headquartered in Madison, WI presently considering candidates for mid & senior level positions.

- Software Engineers
- Programmer Analysts
- Project Managers
- Quality Assurance Technicians
- Fwd resume to Symphony HR Dept @ 608-294-9321 or email:info@symphony.cc

The Face of Pfizer
The best is getting even better! As the world's largest pharmaceutical research enterprise, Pfizer is dedicated to providing the best innovations in medicine while pursuing tomorrow's discoveries in research and development. With an R&D budget of $4.7 billion, our team has spurred Pfizer's exceptional performance in 30 countries and across six continents. If you share our dedication to discovering, developing and delivering medicines to improve the health of both people and animals worldwide, we want yours to be the newest Face of Pfizer. Picture yourself in the following opportunities at Pfizer Global Research and Development facilities in Ann Arbor, Michigan.

Systems Analyst/Sr. Systems Analyst
You'll be responsible for developing, maintaining and providing operational support for our Phase I Management System (PIMS); developing and maintaining applications; and offering technical expertise on various applications/systems supporting Clinical Sciences. Further, you'll develop, test, validate, and provide change management of documentation to support the applications; provide IT hardware, software and backup support for database activities, write ad-hoc queries; and build custom reports. We require an MS in Computer Science or Information Systems backed by 5+ years experience with systems design and web technology. Demonstrated proficiency with Oracle database and PL/SQ is critical. You'll also need experience working in a FDA regulated environment, as well as experience with SDLC and various operating systems, including NT and UNIX. Good interpersonal and communications skills are essential.

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Chief Information Technology Officer: directs the information and data integrity of the enterprise, its groups, and its client projects, for all IT matters; establishes and directs the strategic long-term goals, policies and procedures for the IT department; determines long-term system needs and hardware acquisitions to accomplish objectives; establishes, plans and administers the various software development projects, analyzes client requirements and establishes priorities for feasibility studies, systems design and implementation to develop the best technology or system for client's needs, and oversees system design, architecture and specification development. Requires: bachelors or equivalent (foreign degree through 3 or 4 year program, or through combination of education and experience) in computer science, engineering, math, or similar; 8 years of relevant experience with min. 5 years of Oracle technology experience in relational database design, architecture and planning. Experience requirements may have been gained concurrently. Position based in Portland, OR metro area. Applicants must have legal authority to work permanently in the U.S. Competitive salary/DOE. Send resume to: Human Resources, Goshen Technologies Inc., 1500 NW Bethany Blvd., #255, Beaverton OR 97006

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Must have thorough working knowledge and structure of the GSM association; The International Telecommunications Union; UMTS and 3GPP standards; GSM specifications; ANSI41 Specifications; GPRS Roaming. Must have excellent technical writing skills. Send resume to Agency for Workforce Innovation, P.O. Box 10869, Tallahassee, FL, 32302, and RE: JOFL #2210926.

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Dissecting the Windows 2000 Server Exam

Part 2 & 3

The Installing, Configuring and Administering Microsoft Windows 2000 Server exam (#70-215) became available in June as a requirement in the Windows 2000 MCSE certification track. As of Fall 2000, it does not employ adaptive testing, but is a standard exam with a large number of verbose questions. It is administered through both Virtual University Enterprises (www.vue.com) and Prometric (www.2test.com) testing centers and, like all Microsoft exams, costs $100 to take. *Part 1 addressed Exam Specifics and the first two of the seven test objectives, with this one focusing on the other five objectives.*

Hardware Devices and Drivers

Windows 2000 fully supports Plug and Play devices.

With Windows 2000, a vendor of a third-party product is encouraged to submit the drivers and operating system files (.dll, .exe, .fon, .ocx, .ttf, .sys) to Microsoft. If Microsoft can verify that the files do not behave erratically or cause system problems or identifiable failures, Microsoft signs the file digitally. When an administrator or user attempts to install a new component on her system, the system automatically looks for the signature. If it does not find a signature, a dialog box appears, prompting the user to decide whether or not she wants to continue.

By default, a system always looks for a driver signature; this feature is known as System File Protection. The driver signature is ignored only when the user is using one of the following programs:

- Hotfix.exe
- Update.exe
- Windows Update
- Winnt32.exe

These files are needed to install/repair all or portions of the operating system and thus the driver signature is ignored for them.

The SIGVERIF.EXE utility looks for files that are not digitally signed. You can also customize the verification options: By default, signature verification search results go to the log file SIGVERIF.TXT and you are notified when unsigned files are found during searches.

SFC.EXE is used to automatically verify system files after a reboot to see if the system files were changed to unprotected copies. Unprotected files are over-written by stored copies of the system files from %systemroot%\system32\dllcache (%systemroot% is the folder into which the operating system was installed). SFC can be run only by users with the Administrator group permissions. It also requires the use of a parameter. Valid parameters are shown in Figure 3.

Figure 3: Valid SFC parameters

Parameter	Function
/CACHESIZE=	Sets the size of the file cache
/CANCEL	Stops all checks
/ENABLE	Returns to normal mode
/PURGECACHE	Clears the cache
/QUIET	Replaces files without prompting
/SCANBOOT	Checks system files on every boot
/SCANNOW	Checks system files now
/SCANONCE	Checks system files at next boot

System Performance

Two new runlevels/priorities have been added to processes, making the possibilities, from lowest to highest: Low, BelowNormal, Normal, AboveNormal, High, Realtime. The only way to change the priority of a running process is via Task Manager, which has also been enhanced with an "End Process Tree" option. The only way to start a process at a priority other than its default is to use the Start command line utility.

Windows 2000 uses the term "System State data" to refer to all the components the operating system needs to function. The "System State data" on Windows 2000 Professional is much smaller (a subset) than the "System State data" needed on Windows 2000 Server. On Professional, this includes only Boot (including system) files, the Registry and COM+ database files. On Server, this includes those entries plus Certificate Services database, SYSVOL directory, Active Directory and any cluster information.

The Backup utility–accessible under Start, Accessories, System Tools–performs backups and restores, as well as allows you to interact with the Task Scheduler to schedule jobs and make the Emergency Repair Disk. No longer limited to backing up only to tape, it can write to any media.

Storage Use

The Computer Management snap-in can be found under Administrative Tools and is divided into three sections: System Tools, Storage and Services and Applications. The Storage component provides the basis for working with disk devices and is subdivided into four other sections:

- Disk Management
- Disk Defragmenter
- Logical Drives
- Removable Storage

The heart of this section of the exam objectives resides in the Disk Management tool, and you must be a member of the Administrators group to access this tool. Replacing the Disk Administrator utility from Windows NT, Disk Management surpasses that tool in that it now allows for remote disk management, supports dynamic volumes (except on portable computers),

offers wizards for many choices and allows you to make a great many changes on-the-fly—without requiring a reboot to be active. Microsoft has changed its standard for storage significantly with the release of Windows 2000 by turning to dynamic storage. The entire disk must first be converted to dynamic storage, then you can create and alter volumes without ever needing to shutdown and restart the system for the changes to take effect. By default, every disk starts as the basic type, but can be upgraded to dynamic (unless it is removable).

When dynamic, the pop-up menu for each volume contains the same choices as those for basic, plus the following options as well:

- **Extend Volume**. This option allows you to dynamically change the size of the volume (available only on NTFS volumes). If the volume was originally created on a basic disk, it cannot be extended. If the volume was first created on a dynamic disk, it can be extended.
- **Add Mirror**. With this option, you can enable fault tolerance via mirroring if more than one drive is installed.
- **Reactivate Volume**. This option is available only if the volume is not currently activated.
- **Delete Volume**. This option forces the loss of all data and the space becomes unallocated.

Within Disk Management, there are two frames: the top frame shows each volume, its file system, status and capacity, while the bottom frame shows each disk–including the CD-ROM and the volumes on it. Windows 2000 also includes a disk defragmenter–a menu option that appeared in previous versions of the operating system–but it could never be selected because no such utility was included with the core operating system.

Quotas can be configured only if the drive is NTFS. They allow you to configure the storage limits for users. By default, quota management is not enabled; it must be enabled before any other options can be set. The check box labeled Deny Disk Space to Users Exceeding Quota Limit prevents users from saving their files; when the option is not checked, users merely get a warning. With the last two options, you can specify what happens when a user exceeds the limit; the program can log events or give warnings. (These two values can be configured independently of one another).

Network Connections

No longer just one of multiple protocols that you can choose, TCP/IP is now the required protocol. It is required for all the features new to Windows 2000 that rely upon Active Directory and other services. TCP/IP can have host names resolved to IP addresses with the use of DNS servers (which now interact with WINS servers), and can have IP addresses automatically issued through the use of DHCP servers. In the absence of DHCP or manual addressing, Windows 2000 uses Automatic IP Addressing to assign hosts addresses in the 169.254.x.x range.

Besides TCP/IP, there is also support for (but not default installation of) four other protocols:

- NetBEUI – for older Microsoft clients.
- NWLink – for communication with NetWare servers.
- AppleTalk – for Macintosh clients.
- DLC – for communicating with mainframes and older network printers (newer network printers use TCP/IP).

There are two protocols to use for creating Virtual Private Networks (VPNs):

- PPTP – Point-to-Point-Tunneling Protocol. This one was included with NT 4.0 and is an expansion of the PPP protocol. This protocol uses MPPE encryption.
- L2TP – Layer 2 Tunneling Protocol. New to Microsoft operating systems, it is not new at all, having been used by other vendors for years. IPSec is the encryption it utilizes.

Security

The Encrypting File System (EFS) allows you to toggle an attribute for a file or folder just as you would any other, and it protects the contents. If the object you select is a folder, all contents of the folder–files, subfolders and so on–also become encrypted. Files that are pasted into an encrypted folder become encrypted as well, but files that are placed in the folder with drag-and-drop do not become encrypted automatically.

In order to use EFS, the file system must be NTFS and the files must not be compressed. Some files–system files in particular–cannot be compressed no matter what other conditions exist. If you move or copy an encrypted file to one of these partitions, it automatically becomes unencrypted.

From the time a file is encrypted, a digital code associated with the user (encryption certificate) is assigned to it. This allows the encrypting user to open and work with the file exactly as if it were unencrypted, but prevents anyone else from doing so. Because the file can only be opened by the encrypting user, this makes EFS perfect for personal data, but unusable on any data you want to share.

You can use the Export command in the Certificates snap-in to copy your file encryption certificates to another location–such as a floppy drive. Doing so will allow you to unencrypt your files in the event of a restore operation being necessary after a media failure (at which time you can use the Import command to bring them back from the floppy).

Group Policies and the Group Policy Editor (gpedit) are new and exclusive to Windows 2000. For Windows NT and 9x clients, you must still use System Policies, which can be created with the System Policy Editor (poledit).

Summary

The objectives for the Windows 2000 Server exam cover a lot of ground. While appearing to walk through all the features of the operating system, they truly focus on those items that are new. With a little studying, and a lot of hands-on experience with the operating system, you will be able to pass this exam and be well on your way to being certified as a Windows 2000 MCSE. ■

For more information on Part I of "Dissecting the Windows 2000 Server Exam" please refer to the 9/24/01 edition of ComputerWorld, InfoWorld and Network World.

Advertising Supplement

IT Careers in Web Development

Over the past four years, the primary focus of web applications and development was on basic operation – getting a site up and running and providing data and information to conduct business.

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David Renaud, executive vice president of development, chief technology officer and co-founder of **Satmetrix Systems** in Mountain View, CA, says his company has long been committed to developing web-enabled software that measures, analyzes and allows companies to improve customer satisfaction over time. "**Satmetrix Systems** embeds market research techniques, best practices and benchmark information in its software to provide the most accurate and timely insight available," explains Renaud. "Now, we're enhancing the self-administration capabilities of our software so that web-reporting sites for customers provide greater freedom to navigate and control the system from their end."

While usability is one facet, Renaud says customers also are looking for additional features that broaden the scope and power of applications. "Our client users are now translating customer comments from customer satisfaction surveys into various languages so that the information can be presented to different audiences," he explains. "For example, a survey is conducted in a native language, say French. The company's director of customer service can translate the comments into English, using the software, and present the data to managers who might be based in the United States and use English as their first language."

Renaud says **Satmetrix Systems** has three functional areas for IT careers: 1) overall web globalization management; 2) production of web sites using HTML and XML skills, Java script, graphics and multimedia; and 3) back-end or infrastructure of web sites managing servers and configuration, hardware and software.

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Java Spec

form of remote calls to Web-based applications that use HTTP and XML, Mizzi said. Mizzi's team built the application with JBuilder Java development tools from Scotts Valley, Calif.-based Borland Software Corp., he said, rather than using a J2EE-based application server that didn't adequately support Web services.

J2EE 1.3 is "an interim step in making the Java platform more loosely coupled and standards-oriented," said Darryl Plummer, an analyst at Gartner Inc. in Stamford, Conn. "The 1.4 specification will add more capabilities that are in the [Java Community Process] right now."

SOAP Lacks Support

Inadequate support for Simple Object Access Protocol (SOAP), a standard for swapping XML-based Web services among disparate systems, is another J2EE shortcoming, said Randy Heffner, an analyst at Cambridge, Mass.-based Giga Information Group Inc.

"There is no standard mechanism for SOAP within the J2EE 1.3 environment," Heffner said. As a result, portability between applications written with different J2EE-compatible application servers is hindered.

"There's not anything in the 1.3 specification that supports SOAP directly," said Ralph Galantine, a J2EE product line manager at Sun. Galantine said the Java Community Process executive committee, the governing body for J2EE, would address Web services functionality in Version 1.4. Company officials aren't sure when Version 1.4 will be released.

Plummer noted that rather than wait for SOAP and Web service features to get formalized in J2EE, some licensees, such as IBM and San Jose-based BEA Systems Inc., have added that support on their own.

The J2EE 1.3 specification includes a new Java connector architecture, a Java Message Service (JMS) and XML integration support, as well as improved Enterprise JavaBeans (EJB) 2.0. These features are aimed at simplifying application integration and pulling data from back-end systems, such as enterprise resource planning or customer relationship management systems, Galantine said.

The new specification also addresses problems with EJBs and their ability to port data between application servers, he said. It requires application vendors to support JMS and the same version of Internet Inter-ORB Protocol in order to pass compatibility testing.

Requiring JMS is important, said Heffner, because without it, there is no guarantee that applications can "talk" to one another.

Joe Choti, chief technology officer at New York-based Major League Baseball Advanced Media LP, said he believes that JMS support should make information transfers easier within the Java application environment, but he added that he would like to see more.

In particular, MLB Advanced Media has difficulty retaining user information on its Web properties when an EJB server crashes due to problems with the structure of persistent session beans, which are EJBs that get saved and stored in client sessions, Choti said.

MLB Advanced Media uses application servers and tools from iPlanet E-Commerce Solutions, a Sun-Netscape Alliance partner.

"We're still struggling to exploit the functionality that is proclaimed to be in the standard that just isn't working for us, like replication, clustering and fail-over," Choti said.

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Online Attacks

ing of two powerful trends into one major problem. Without changes by vendors and end users in the design and deployment of systems, there could be economic consequences, warned security experts.

"Today's commercial off-the-shelf technology is riddled with holes," said Richard Pethia, director of the CERT Coordination Center at Carnegie Mellon University in Pittsburgh. "The sheer number of vulnerabilities is overwhelming organizations."

Pethia, testifying last week before a U.S. House subcommittee examining Internet security, said reactive solutions, such as applying patches, "are reaching the limit of their effectiveness."

Software design vulnerabilities have been consistently rising because of difficulties in configuring operating systems and applications and because vendors make security a low priority, said Pethia. CERT reported 400 vulnerabilities in 1999 and 1,090 last year, and it expects the number to hit 2,000 this year. Compounding the problem are fears that Internet-related terrorist incidents will increase.

"I believe the threat is even greater today than it was before Sept. 11," said Michael Vatis, a former assistant director for the FBI and former head of the National Infrastructure Protection Center (NIPC), the government's lead agency on cybercrime issues.

Vatis, now head of the Institute for Security Technology Studies at Dartmouth College in Hanover, N.H., based his prediction on a study of cyberattacks during prior conflicts, such as the capture of a U.S. spy plane by China in April.

"The possibility is there to take down significant portions of the Internet and the critical infrastructures that rely on the Internet," he warned in testimony he gave last week before the House Subcommittee on Government Efficiency, Financial Management and Intergovernmental Relations.

Pethia underscored the point. While much of the Internet is very robust, he said, "there are those few key points like domain-name servers that don't have enough redundancy or ability to quickly recover from attack. If we focused in on those key points, we can make a lot of progress in a short period of time."

Vatis and Pethia said software vendors have to make security paramount. End users agree.

The problem is that security isn't a driving factor for software firms in marketing their products or for end users in choosing them, said Eric Brock, information security manager at Dallas-based cosmetics company Mary Kay Inc.

"Security professionals need to do a better job of communicating risks to business decision-makers," said Brock. If security becomes a bigger part of software buying decisions, vendors will have to pay closer attention to it, he said.

Harris Miller, president of the Information Technology of America in Arlington, Va., who also testified at the hearing last week, said it would be inaccurate to say the Internet is vulnerable. "There are obvious physical risks," he said. But while no design is perfect, software makers are trying to build systems with the highest security settings, he said.

However, end-user companies don't always take advantage of those security features and sometimes turn them off, he said.

Wilfred Camilleri, information security manager at the University of Toronto, said end users are having a tough time staying abreast of patches.

"The problem that we are encountering most often is that people are not aware that patches are available," he said.

Ronald Dick, chief of the NIPC, said that about 80% of the issues his agency tackles could have been avoided if systems administrators "would just download a patch and repair their systems."

Is Y2k a Blueprint for Organizing IT?

In preparing for Y2k, the White House appointed a czar to organize critical industries to combat the problem. Business and government worked closely together across sectors and established a command center for information to help U.S. businesses deal with the problem. A few months into 2000, it was dismantled.

Now a push is on to put it back together. Michael Gent, president of the North American Electric Reliability Council in Princeton, N.J., has been meeting with other utility CEOs to test interest, said spokeswoman Ellen Vancko.

Harris Miller, head of the Information Technology Association of America, said the Y2k network should have never been shut down.

"That was a decision made by the outgoing administration over our strong objections," he said.

John Koskinen, Washington's city administrator and former head of the White House Y2k effort, said that unlike the year 2000 problem, today's threat to IT is undefined, the response is difficult, and there is no known time frame.

"Nonetheless, I don't think there is any way to deal with determining the nature of the threat, protecting against it and having appropriate mechanisms in place without an effective renewal of those partnerships or networks across the economy," he said.

Koskinen believes it will be up to the White House, but particularly the new head of the Office of Homeland Security, Pennsylvania Gov. Tom Ridge, to decide whether to reform the network.

– Patrick Thibodeau

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BPA ABM RED TAG

FRANK HAYES/FRANKLY SPEAKING

Time to Retool IIS

FAIR IS FAIR. I've kicked Gartner analysts for some dumb ideas over the years, so it's only fair to recognize one of them for getting it right. And last week, Gartner's John Pescatore made what's probably the gutsiest call you'll hear from any analyst this year. Pescatore recommended that IT shops using Microsoft's Internet Information Server (IIS) should "immediately investigate alternatives to IIS" because of its security problems (see story, page 10).

Gutsy? You bet. Gartner's customers don't have a lot of spare money to replace key systems right now. And they don't want to look bad for having picked a lousy system. So the advice that big IT shops should dump a major Microsoft product is likely to go down like a live frog.

Microsoft insists that IIS is no worse than its competitors' products. Loyal customers insist they want their IIS. Other consulting firms are making kissing noises in the direction of Redmond.

But Pescatore is right. IIS is broken, and the endless stream of patches isn't enough. IIS should be rewritten from the ground up, with the kind of attention to security and software quality that we need from serious IT infrastructure products.

And Microsoft won't do that until IT shops stop accepting Microsoft's excuses and justifications.

If those excuses and promises were just a smoke screen for a furious effort on Microsoft's part to roll out a secure IIS, it wouldn't be necessary to call for pulling the plug.

But unfortunately, that's not the case. Microsoft's focus is on fighting off complaints about and competitors to .Net and Passport and HailStorm. Security and code quality are getting short shrift.

If this were any other industry, there would be government investigations and class-action lawsuits. If Microsoft made faulty automobiles, the company wouldn't get away with sending every customer hundreds of parts to retrofit and then insisting it was the customer's fault in case of a crash.

But this is the IT business, where we've put up with decades of shrink-wrap licenses and nobody's-perfect shrugs from software vendors. The law says Microsoft doesn't have to care whether its products work. The only people who can make Microsoft care are the people who cut the purchase orders.

Which means it's time for IT shops to compare what replacing IIS will cost — in price, functionality, code rebuilding and staff retraining — with the cost and risk of all those patches and all those worm attacks.

It's time for corporate IT managers and CIOs to look at hard numbers on those costs and risks and to take those numbers seriously — especially when it's time to make decisions on new Internet applications and upgraded server software.

Maybe most important, it's time for Microsoft to respond. Not with more "We're no worse than anyone else" excuses. Not with a public relations campaign, or a hard sell aimed at customers. But with a plan — a plan to create an industrial-strength Internet server that doesn't ship with gaping security holes, doesn't require constant patching and doesn't hand every antisocial teenage cracker a tool for creating chaos.

Can Microsoft build a secure IIS? Sure. Microsoft has some of the smartest programmers in the world. It has the resources to hire whatever talent and skills it doesn't already have. All Microsoft lacks is the will to do what needs to be done.

We all know the man who can provide that will. His title says he's in charge of software at Microsoft. The stock he owns says he calls the shots.

So over the coming weeks and months, while you're looking hard at alternatives to IIS, keep an eye on the man who should have a plan.

And maybe we'll find out if Bill Gates is as gutsy as John Pescatore. ◗

FRANK HAYES, *Computerworld*'s senior news columnist, has covered IT for more than 20 years. Contact him at frank_hayes@computerworld.com.

SHARK TANK

SALES VP spends all day typing up a forecast, prints it, then closes the document without saving it. His frantic aide races to an IT pilot fish for help. "She believes that I can find the document if it's been less than an hour since it was closed without saving," says fish. It doesn't work that way, says fish, but aide doesn't want to believe it: "Isn't there some place it just goes for an hour?"

USER STICKS his head into IT pilot fish's office to complain that the water cooler in the conference room isn't getting the water cold enough. Suggests straight-faced IT pilot fish, "Have you tried rebooting it?"

IT SHOP'S HARDWARE guys don't like how hard it is to remove the cover from one server they're evaluating, so they give it a thumbs down. That's unfair, reseller tells pilot fish: "The hardware is extremely reliable and hardly ever has to be opened for repairs."

FIVE MINUTES AFTER his PC's operating system upgrade is complete, user tells IT pilot fish, "I have one program that's not working." Fish tries every trick he knows for two hours, but he can't get the software to run. Finally, he offers to return the PC to its pre-update state. "That's OK," user says. "It never worked on this machine anyway." Why didn't you tell me that? fish demands. "Oh, I figured you'd know how to make it work."

BOSS'S PC won't start, so support pilot fish starts walking him through the usual troubleshooting procedure. After several steps, boss interrupts: "Do you think all the ants coming out of the surge protector could have anything to do with it?"

MY PC HAS fallen asleep, user insists. "Do you mean the screen is blank?" asks pilot fish. No, it's asleep. "How do you know it's asleep?" Because it's *snoring*, user says. Sure enough, there's a stream of Zs running across the screen, fish sees when he arrives. There's also a notebook sitting on the Z key, fish notices. He surreptitiously nudges the notebook off the keyboard – and shouts, "Wake up!"

Wake me up, too: **sharky@computerworld.com**. You score a sharp Shark shirt if your true tale of IT life sees print – or if it shows up in the daily feed at *computerworld.com/sharky*.

The 5th Wave

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